THE INSTITUTE OF PETROLEUM REVIEW

V. 13 #156

December 1959

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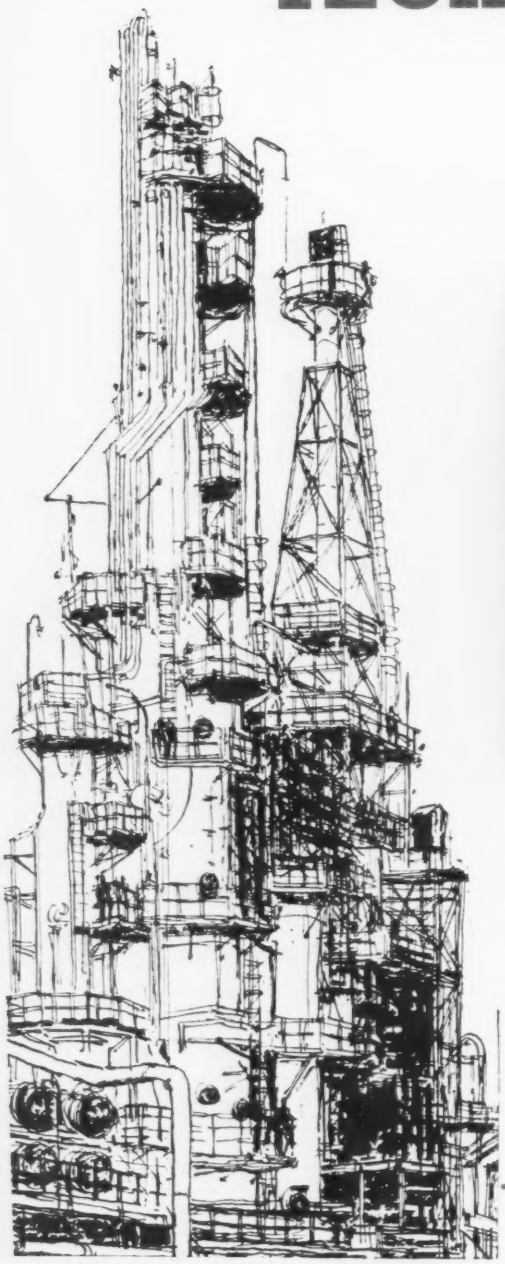

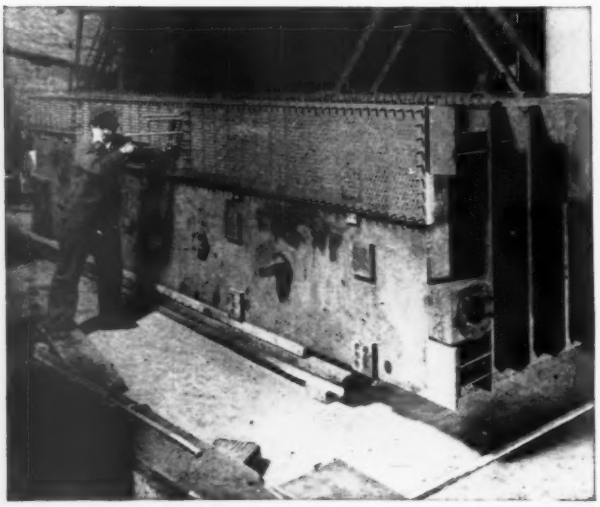

A 50,000 gal. day evaporator for a refinery under construction by Procon (Great Britain) for Anglo Ecuadorian Oilfields, Ltd., being tubed with SERCKALBRA.
(Photograph by courtesy of Richardson, Westgarth and Co., Ltd.)

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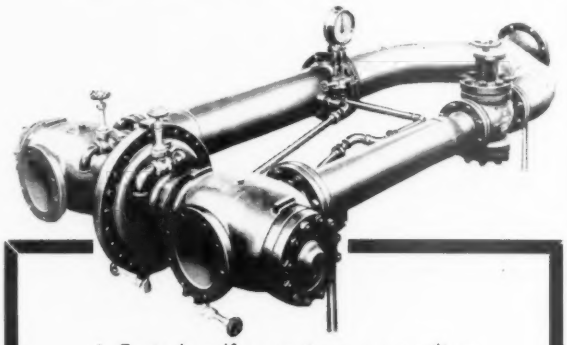

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REVIEW

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Contents

CALTEX CENTRAL LABORATORIES	365
MILFORD HAVEN REFINERY	370
THE NEW OLEFIN PLANT AT WILTON	372
PERSONAL NOTES	376
AROUND THE BRANCHES	377
NOTES OF THE MONTH	379
GAS COUNCIL REPORT	382
NEW SUPERTANKER JETTY ON THE MERSEY ...	383
SCOTTISH HALF-YEAR OIL CONSUMPTION	384
"PIONEERS OF PETROL"...	385
BOOKS AND FILMS	386
LECTURES, COURSES, AND CONFERENCES	388
TRADE LITERATURE, ETC.	388
FORTHCOMING MEETINGS	390

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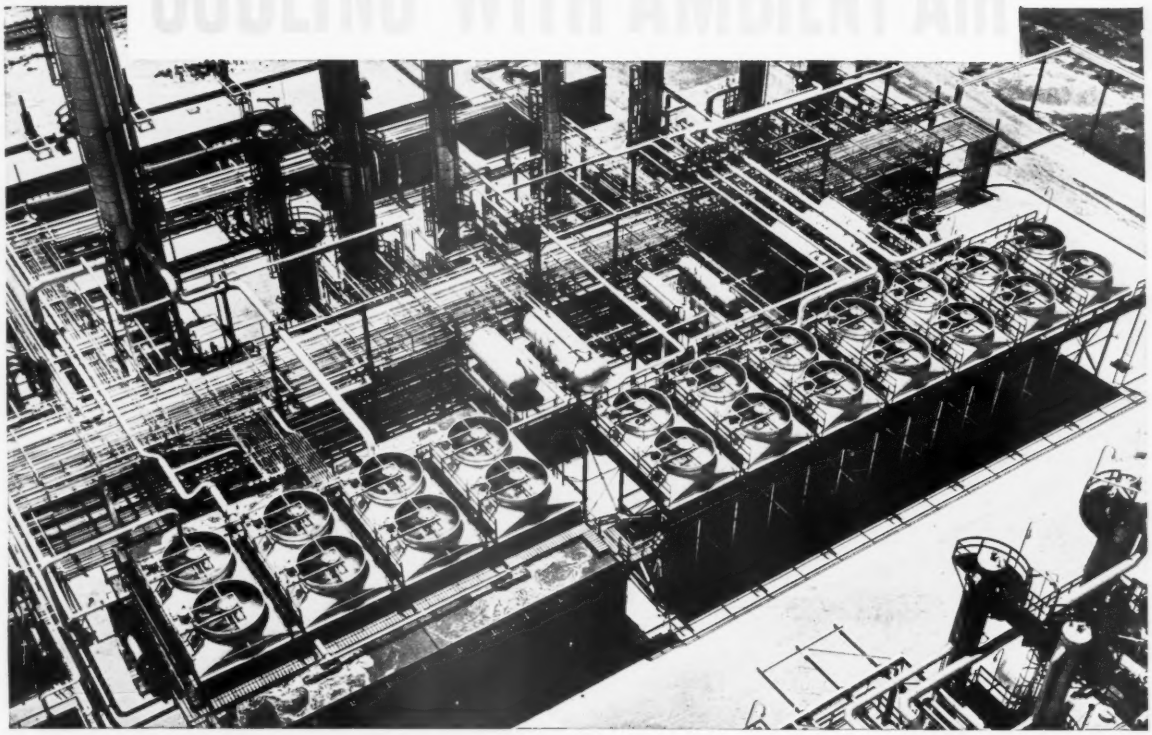

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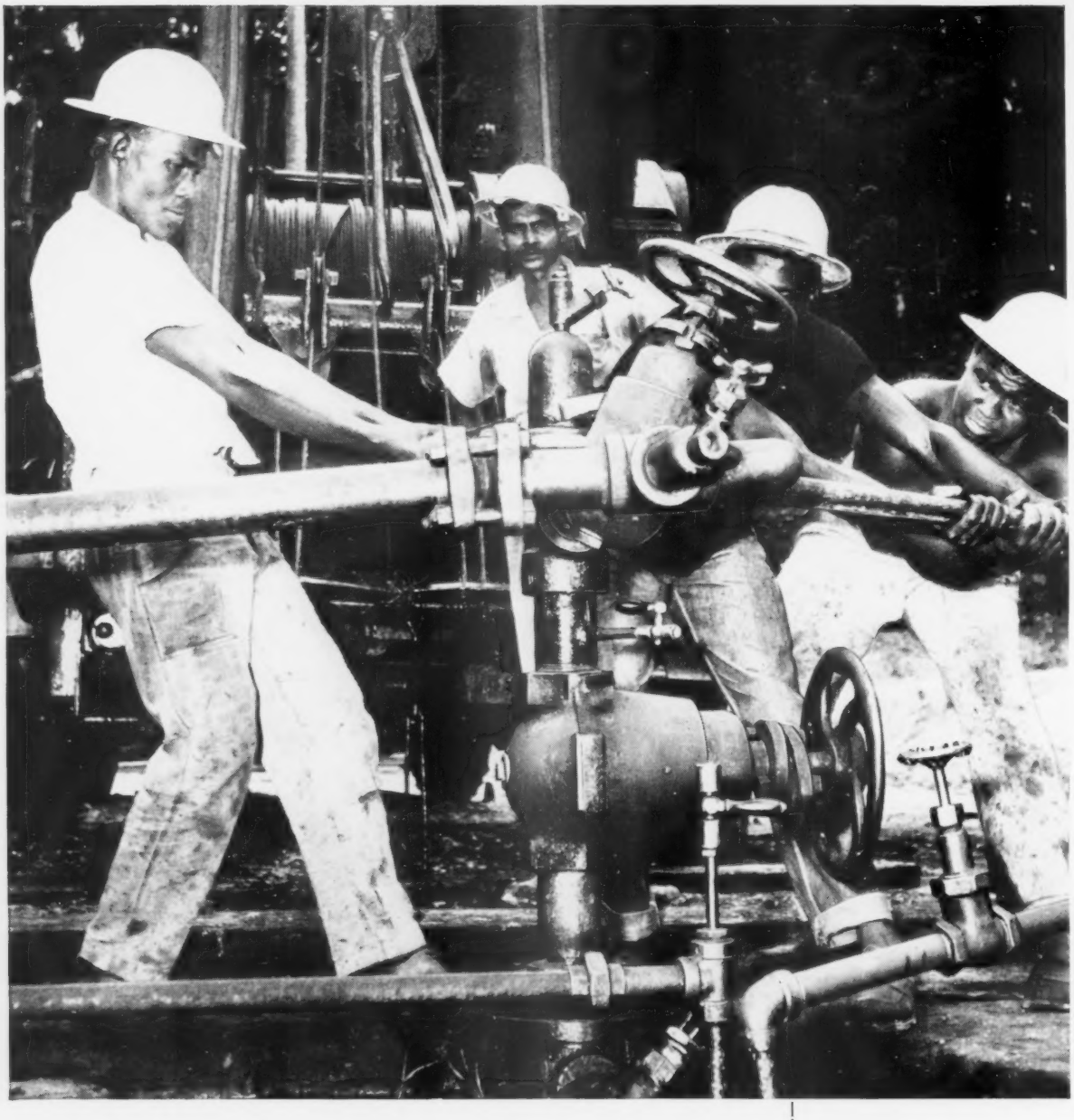

Trinidad. A production crew carry out service on a wellhead assembly. British Petroleum has a 77% interest in the Trinidad Petroleum Development Company Limited, which last year produced nearly three-quarters of a million tons of oil.

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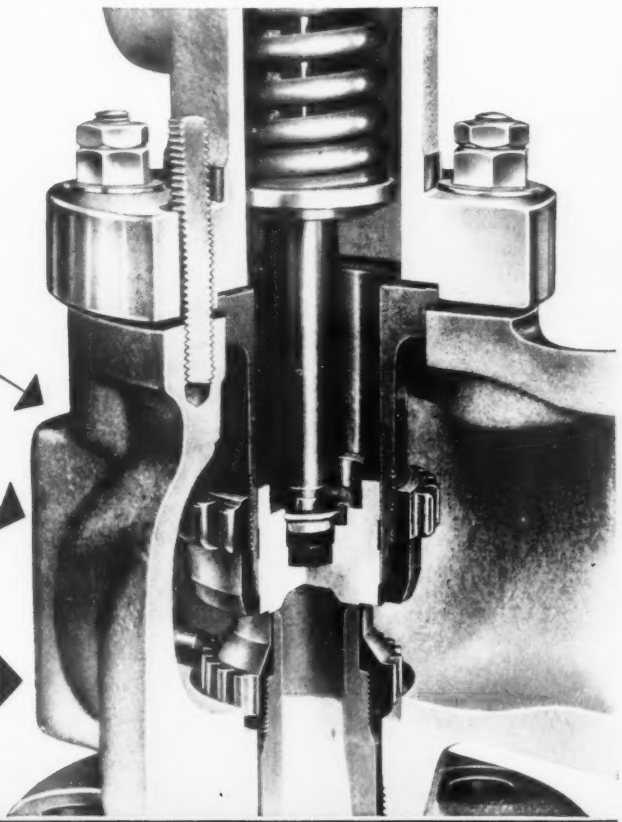

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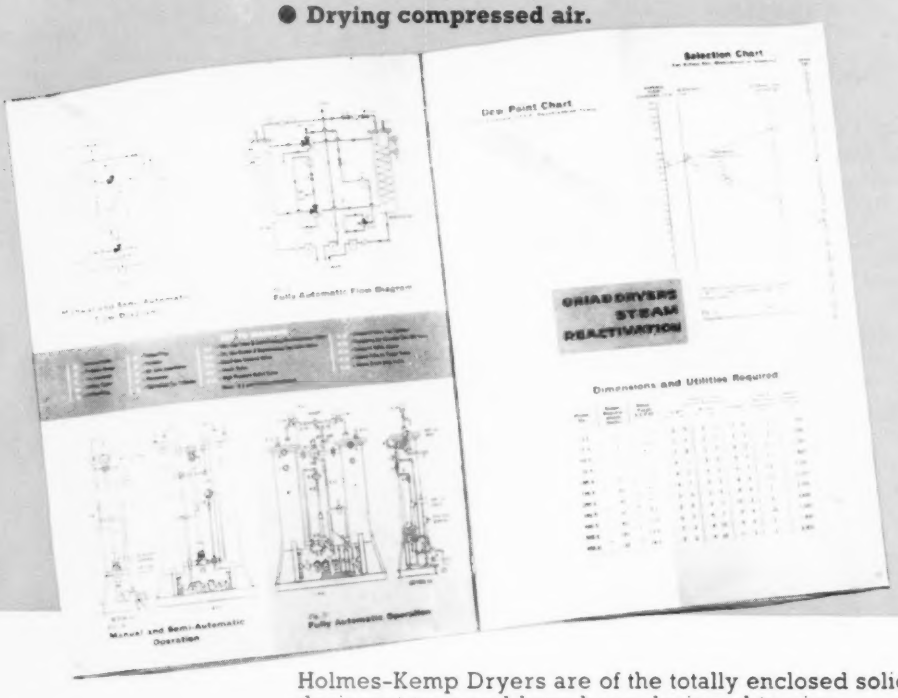

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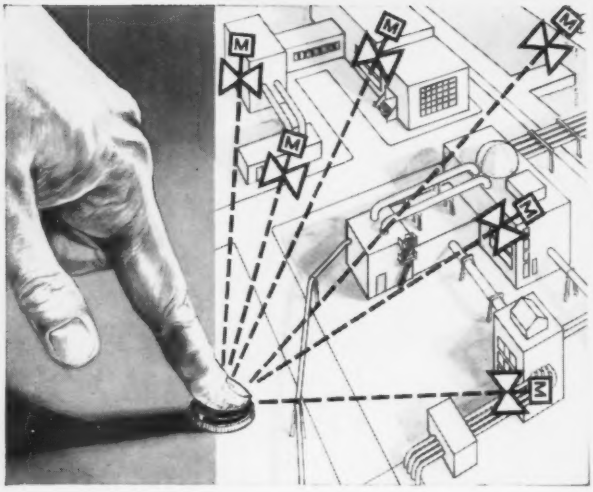

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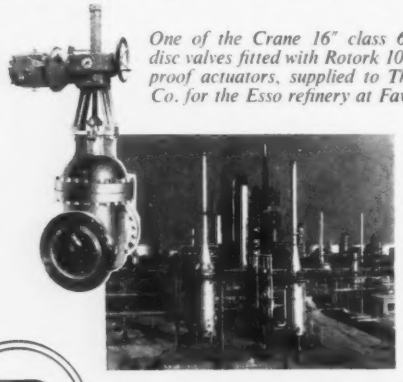
A booklet covering all aspects of Rotork valve control is available to all pipework planners on request.



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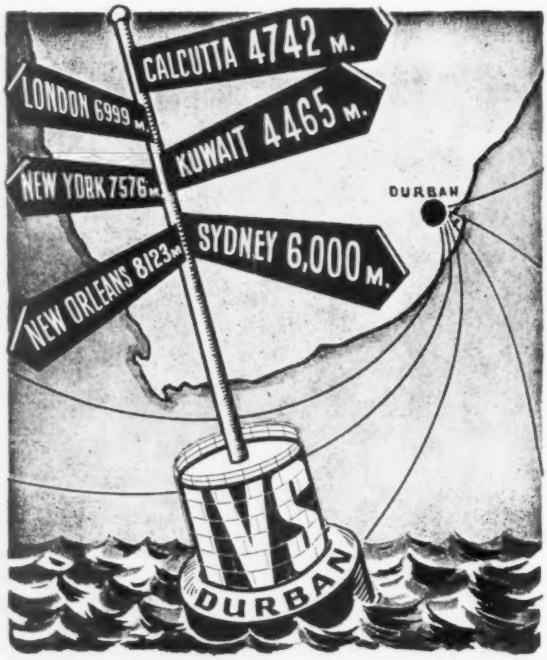

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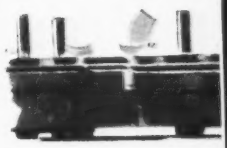

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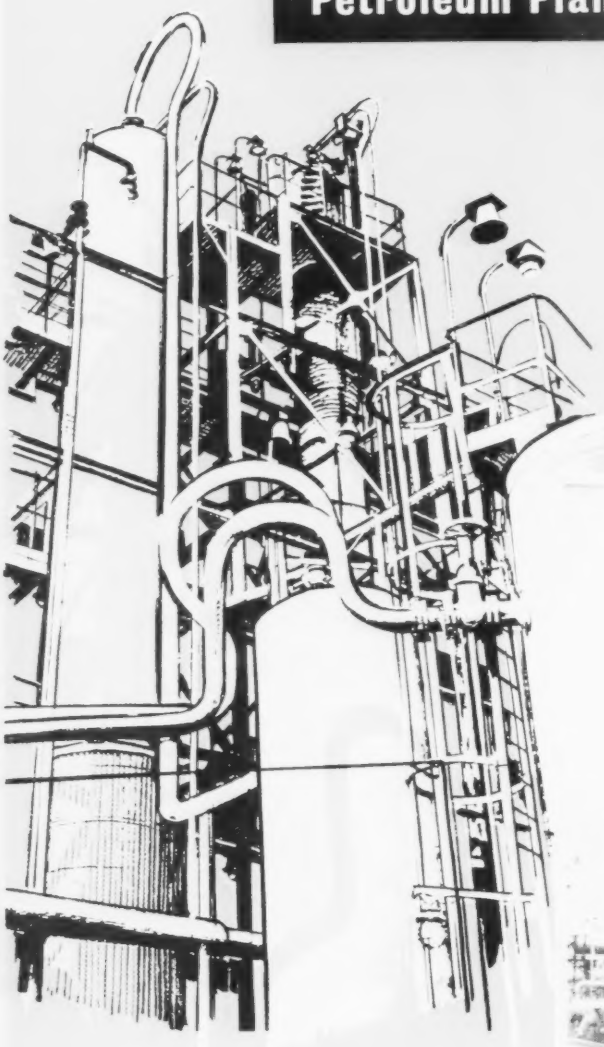

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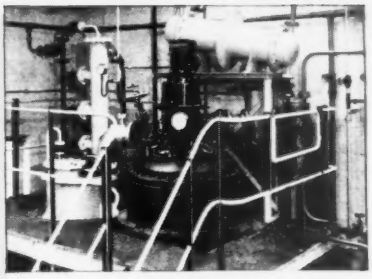

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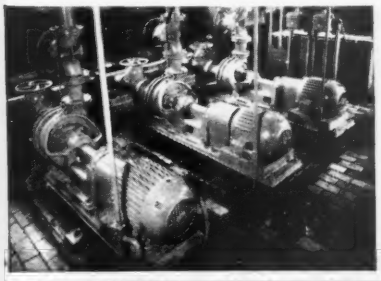
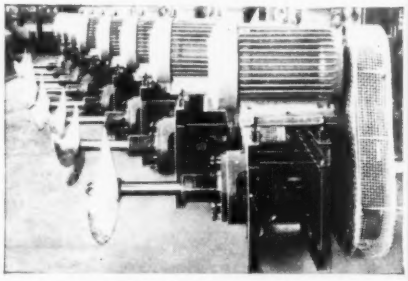
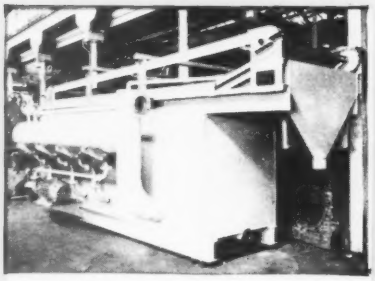


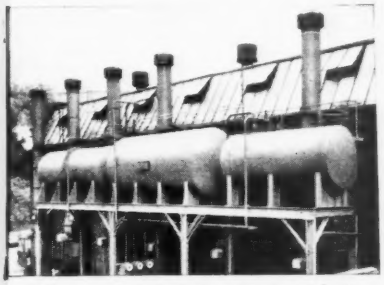
Battery of Mitchell centrifugal acid pumps in a rayon factory.



Battery of large side-entry mixers for petroleum blending.



Gibbs air flotation cell plant for the removal or recovery of greasy residues.



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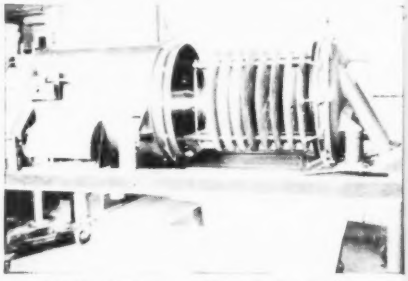

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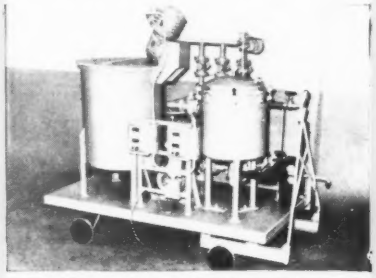

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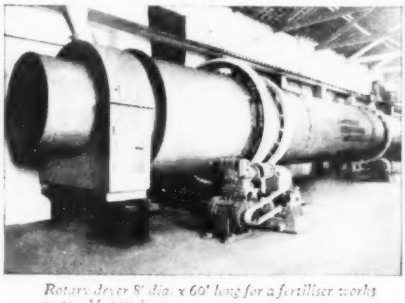

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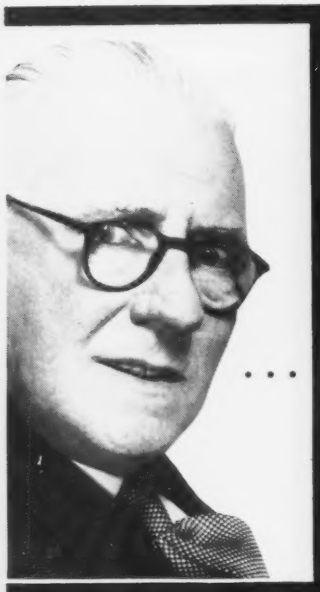

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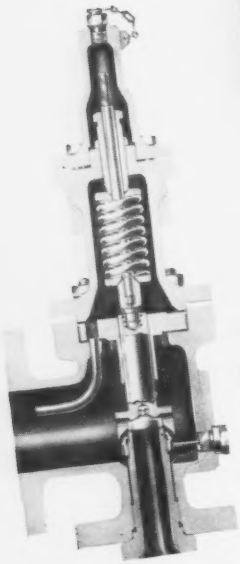

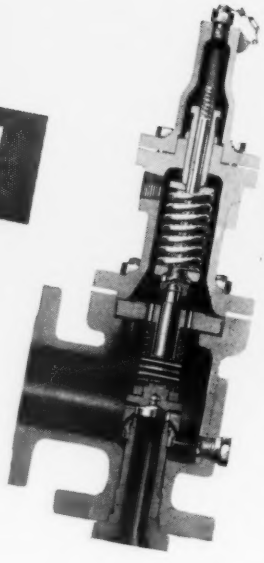

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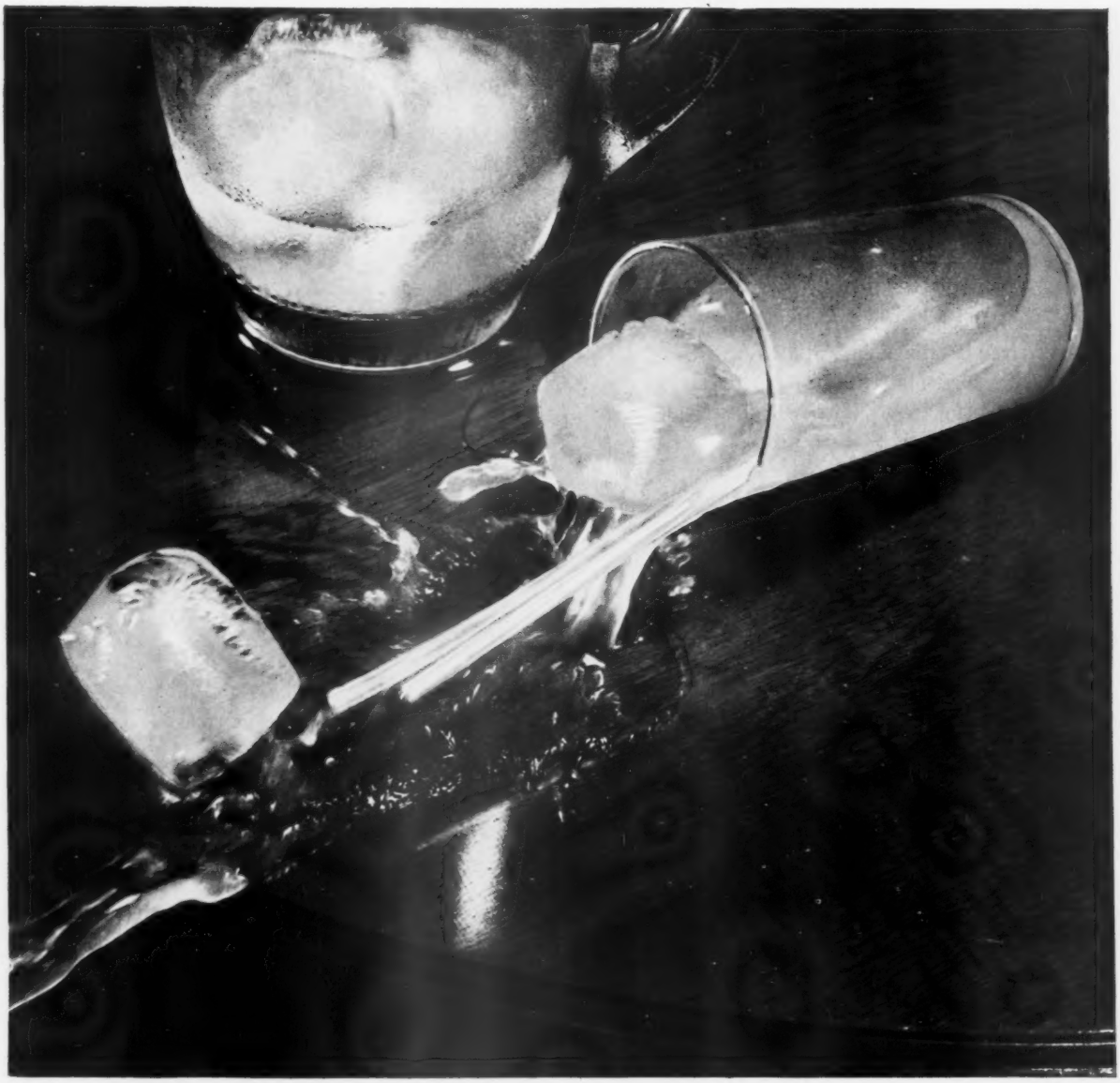

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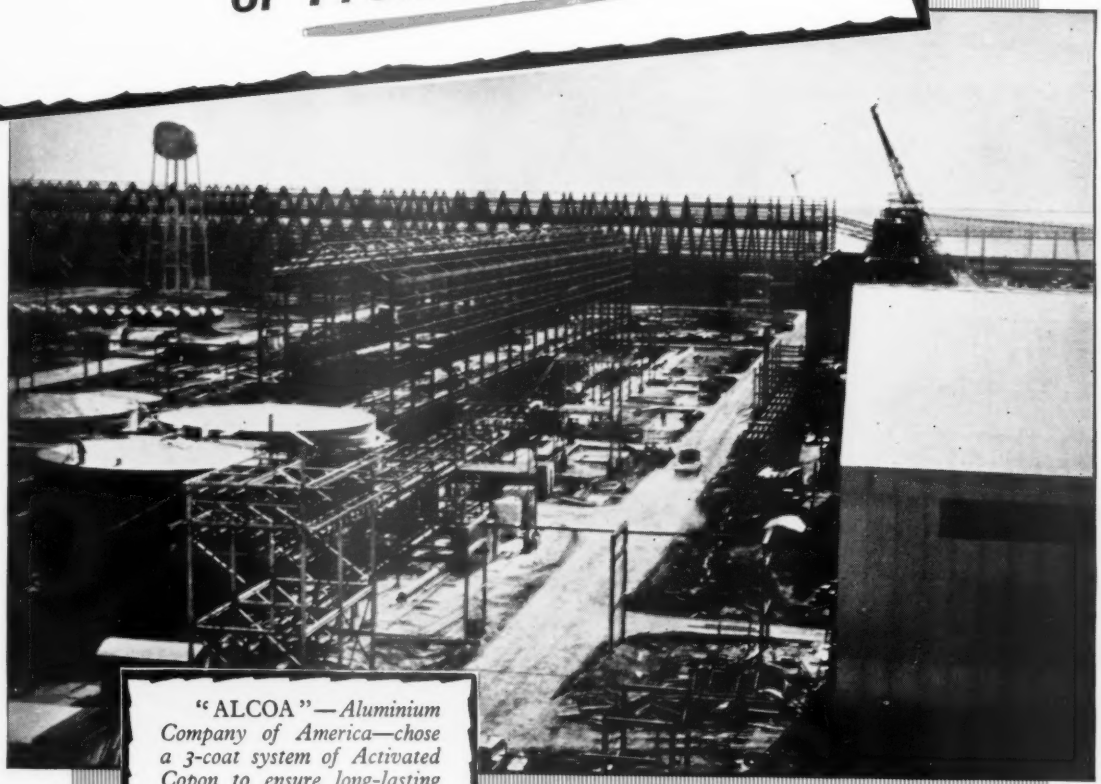

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THE INSTITUTE OF PETROLEUM
REVIEW

Volume 13, No. 156 December 1959

Honorary Editor: E. B. EVANS, M.Sc., PH.D., F.R.I.C. *Hon. Associate Editor:* D. L. SAMUEL, B.Sc., A.R.I.C. *Editor:* GEORGE SELL

Caltex Central Laboratories

Product Development at Pernis

The Caltex Central Laboratories (CCL) at Pernis, Rotterdam, which were formally declared open by HRH Prince Bernhard on 1 May 1959, are a concentration of the Caltex's technical service and development work in the Eastern Hemisphere and in the refineries in which the Company owns or has interests. These countries include Holland, France, Italy, Lebanon, Spain, Bahrain, Australia, Philippines, Japan, and India.

It was obvious that considerable advantage was to be gained by Company and customer alike if the technical service and development work on products could, as far as possible, be concentrated in one spot. Therefore Rotterdam was chosen as the most central location for such an organization and Caltex Central Laboratories NV was formed to put the project into operation.

Recently the editor of the IP REVIEW was privileged to visit CCL and a necessarily brief description of the facilities and operations of the laboratories follows.

The buildings, which number five in all, and have a floor area of about 40,000 sq ft, are pleasantly situated on the south bank of Nieuwe Maas river and in close proximity to the Caltex Pernis refinery. There is ample room for expansion and already plans are being formulated for additions to several of the buildings.

On entering the main building the visitor is faced with a large photographic mural depicting the Caltex operations throughout many parts of the world.

Organization

Under the management of L. H. Mulit, the work of CCL is organized in two main divisions—Technical Services and Laboratory Operations.

Total staff numbers about eighty, of whom thirty-five are professionally qualified, the remainder consisting of technicians and office and similar personnel. While the majority are of Dutch nationality at least a dozen have been drawn from other countries, and have brought with them a wealth of knowledge of local requirements and conditions. CCL also has representatives in the Caltex marketing areas who are able to keep them in constant touch with problems as they arise from users of petroleum products.

Technical Service Division

This is the smaller of the two divisions of CCL and is staffed mainly by individuals who specialize in dealing with problems associated with the application of petroleum products. The section has two main sub-divisions—Fuels and Specialities, and Lubricants. Where laboratory work is called for it is carried out in the Laboratory Operations Division.

Laboratory Operations Division

The work of this Division of CCL is to carry out investigations into

The 100-litre distillation unit is CCL-designed and can simulate full-scale operations

the development of products to meet always changing needs, to deal with day-to-day problems as they arise, to assess new crude oils in respect of their subsequent treatment in the Caltex refineries, to examine catalysts, to carry out analytical tests on refined products, and to make investigations on specific problems and developments put forward from the Technical Services Division.

To carry out its work, the Laboratory Operations Division has two main sub-divisions—General Laboratories, and Engine Laboratories.

General Laboratories

This sub-division is further broken up into five sections, each with its own laboratory and its own qualified staff. Every laboratory is well-equipped with the normal standard apparatus as required, but it was particularly noticed that much special equipment had been installed and was in operation. Some of the latter will be mentioned in more detail in this account.

Pilot Plants

Primarily this section has two main functions—to evaluate petroleum fractions in terms of product quality in order to determine optimum refining conditions, and to evaluate and examine catalysts for various conversion processes.

To carry out these investigations, two versatile pilot plants are installed. The first of these is a multi-purpose hydrogenation unit which can be used for a variety of processes, including catalytic reforming, catalytic desulphurization, catalytic hydrotreating, and will later be used for work on the isomerization process. Among the purposes for which it has been used is the testing of platinum-type catalysts for efficiency and quality of resultant product. The plant is of the fixed-bed type, and it has a throughput-capacity of 100 to 300 ml per hour of feedstock.

The second main pilot plant is a "midget" fluid catalytic cracking plant having a throughput of from 250 to 400 ml per hour. The main use of this pilot plant is for the evaluation of cracking feedstocks and catalysts.

Both these plants are in continuous operation in connexion with full-scale operations in the Caltex Eastern Hemisphere refineries.

Catalysts are examined not only under operating conditions but also for their surface properties, particle size, crushing strength, carbon content, and activity. For carbon content determination a Lumetron colorimeter is employed, which measures the percentage of a beam of light reflected by a sample of the catalyst. Several types of apparatus are available for the determination of activity, these including the UOP and the American Cyanamid Company methods.

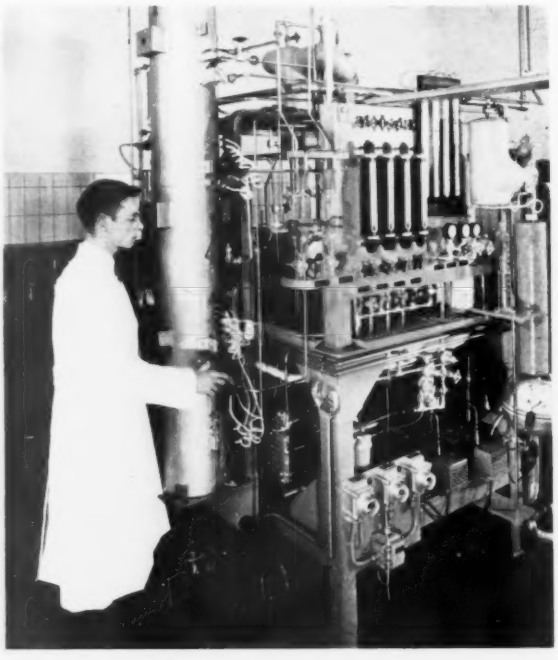
Distillation

Next in the sequence of laboratories or sections is that devoted to distillation, and here a most important and interesting piece of equipment is a 100-litre distillation unit. This was designed by CCL and built in Rotterdam.

The flask is of stainless steel, the fractionating column being 8 ft high and filled with steel rings. It is electrically heated and controlled and can operate under vacuum or at pressures of up to 200 psi. Operations in a full-scale unit can be simulated and the pilot is used for the evaluation of crude petroleum and for the preparation of special blending stocks or of feedstocks for examination in the refining pilot plants.

The distillation section contains also some very useful glass apparatus for the more accurate fractionation of

The "midget" fluid catalytic cracking plant provides valuable information on feedstocks and catalysts



petroleum products and for special investigations. Two particular types noticed were those using spinning band and spinning auger techniques in the columns.

Lubricant Performance

Most of the work carried out in this section is done on behalf of Caltex marketing organizations or for customers or is concerned with the development of improved lubricants. Thus, much of the equipment consists of performance type test rigs for the measurement of those properties desirable in lubricants. For example, several types of test for corrosion were noticed, as well as a number of wear and extreme pressure testers, including the German FZG, the Falex, the Timken, and the Almen. Also, it was noted that the new ASTM pressure viscometer (D 1092) was in operation.

Fuels

This section is chiefly concerned with gas turbine fuels, kerosines, diesel fuels, and heavy fuel oils, gasoline being dealt with in the Distillation Section.

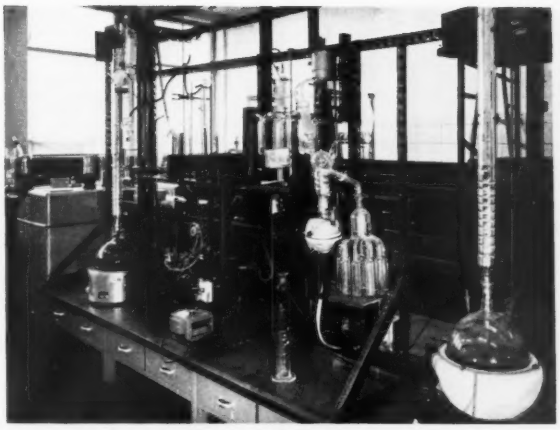
One of the most important tests carried out in this laboratory is the thermal stability of jet fuels, this being done in the ERDCO Coker. When, in a jet engine, the fuel is used to cool hot lubricating oil by heat exchange it subsequently passes through the nozzle area of the engine where fuel degradation particles may become trapped. Therefore, it is important that the jet fuel should have a high thermal stability. The Coker test simulates actual practice. In the Coker unit, the fuel flows through a pre-heated tube and a filter, the pressure drop across the filter and the deposit on the preheater tube being examined.

The Erdco coker used for testing the thermal stability of jet fuels is an example of the up-to-date equipment used in CCL

Apparatus is also installed for the determination of the Luminometer Number of aviation turbine fuel using the CRC Luminometer unit. In this method a sample of the fuel is burned in a lamp similar in design to the IP Smoke-Point Lamp. The temperature rise across the burner at a constant flame luminosity is compared with that for two reference fuels, the present reference fuels being tetralin and *iso*-octane.

Analytical

Investigations in this section are concerned with the development of analytical methods and the carrying out of such type of work on behalf of other sections and of the Technical Service Division.



Accurate fractionation required for special investigations is obtained by using the spinning band technique (right) on the spinning auger (centre)

For the day-to-day routine tests the laboratory is well-furnished with apparatus to IP and ASTM specifications. It is also constantly engaged on the work of improving these or developing new techniques for new products so that the refining companies are better able to control production methods to main product specification standards.

Equally important, and perhaps more so, is the work carried out on the analysis of crude petroleum, petroleum products, catalysts, etc. and it is for this field of operations that some interesting apparatus has been made available.

For example, an X-ray fluorescence spectrograph is in constant use for the determination of the elemental composition of crude petroleum and its products and a host of other materials related to the refining industry. The estimation of trace elements is an important aspect of this work and this type of instrument has proved so useful that a second instrument capable of working down to elements of atomic number 12 was being installed at the time of the visit.

For the separation of individual components of gasoline, three-stage gas chromatographic equipment is available and can separate up to 70 or 80 components from a sample.

The all-weather chassis dynamometer at CCL covers all conditions of climate and travel

All engine cells have outside control panels, operating data being recorded electrically on one main dial. This will facilitate installation of centralized data logging machines later

In connexion with hydrocarbon type analysis, a midget propane deasphalter is used to assist the estimation of the true wax content of crude petroleum and of residues.

Engine Laboratory

The work of the Engine Laboratories sub-division of the Operations Division is carried out under two main sections—the testing of fuels and lubricants and the determination of the fuel and lubricant requirements of engines fitted to cars and trucks. These investigations are made under operating conditions in actual vehicles or under standard conditions in test cells.

Chassis Dynamometer

A most important piece of apparatus, and the first of its kind to be installed on the Continent of Europe, is the All-Weather Chassis Dynamometer. Housed in its own building and with its own instrument panel room, all types of climatic and road conditions can be simulated and used in the assessment of fuel and lubricant performance anywhere in the world. Temperatures can be varied from —30 F upwards, humidity can be regulated up to 100 per cent, road load can be varied continuously from level to steep hill conditions, and wind speed can be varied to suit the rate of car travel. Every size of vehicle, car or truck, can be accommodated in the chamber and speeds of up to 100 mph can be attained. During a test, the car and the dynamometer are under the complete control of a driver, who is clad in fur-arctic clothing when operating at low temperatures. Safety practice is exercised by also having an operator in the instrument panel room, he being in telephonic communication with the driver and having the test car under observation through a 5-layer thermopane window.

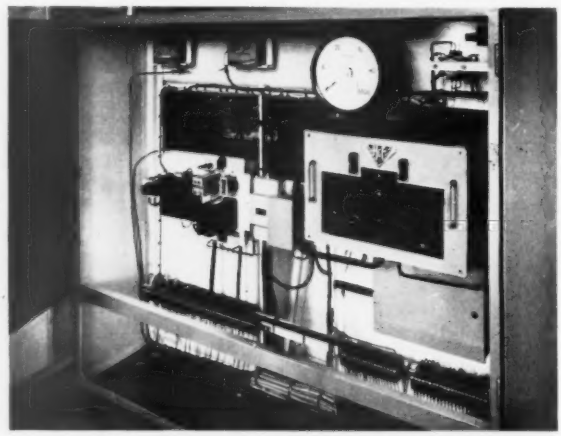
All operating details—temperatures at various selected points in the car and in the chamber, car speed, horse-power developed, and so on—are automatically recorded. The writer was able to observe a warm-up test in operation and to inspect the full equipment making up the complete machine. Other tests which can be made include carburettor icing, vapour lock, and road octane ratings.

In addition to the chassis dynamometer there are available a number of stationary gasoline or diesel engines, for which six large and one small test cells are provided. Each large cell is provided with two or more bedplates adjustable to accommodate any engine. As is usual, all cells have outside control panels and, with an eye to the future, temperatures and pressures are recorded electrically on one main dial; thus, centralized data logging and machine computation could be installed in the future.

Gasoline Engines

While the usual CFR engines are used for the normal determination of octane numbers under the standard conditions, there is a wide variety of other engines in use for the investigation of special problems. Thus, a popular make engine, modified to give a compression ratio of 11 : 1, is used to control work on the possibility of manufacturing economical fuels of high octane number for the time when ratios of this order come into use. An interesting aspect of the tests under way at the time of the visit was the automatic operation of the engine on a continuous cycle through all four gears. This was accomplished by means of a Heenan and Froude acceleration and cycle controller.

In view of the popularity of the Volkswagen in Europe, one of these engines has been installed in a test cell and is used for investigations of fuel composition. The small 2-cycle engine from a pedal cycle is also used to a considerable extent for fuel and lubricant tests and four such engines are mounted on one bench. The Saab, three-cylinder, two-cycle automobile engine is used in a companion test to the pedal cycle engines.



Interior of the control panel of the Heenan and Froude acceleration and cycle controller used to provide continuous automatic operation of an engine through all gears

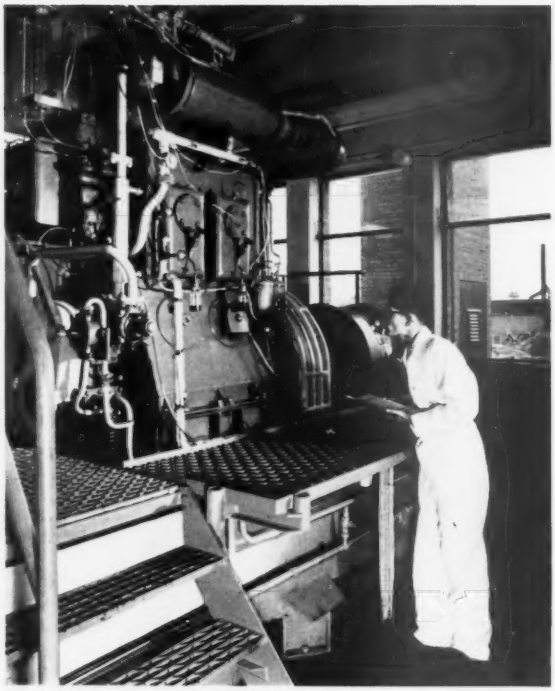
Diesel Engines

Fuels and lubricants for diesel engines are given special attention and an extensive range of engines includes the Foden Gardner 6 LW, the Chevrolet L 4, the Caterpillar L 1, the CLR, Petter's, and so on. Thus, it is possible for all the standardized tests to be performed, while other engines are available for the company's own special investigations.

A useful example in one cell was a 2-cylinder 2-stroke crosshead marine diesel, typical of the type used for the propulsion of coasters, tug-boats, river and canal craft, and for powering auxiliary machinery. This has proved to be a useful instrument, not only for examining marine cylinder lubricants but also for use with general diesel fuels and crankcase lubricants.

Road Tests

Coupled with the bench and dynamometer tests, it is the company's practice to carry out regular road tests for the purpose of further examining (a) the performance of various



A useful piece of equipment for investigations of diesel fuels and crankcase lubricants is this Bolnes 2-cylinder 2-stroke crosshead marine diesel

fuels in a wider variety of motor vehicles, and (b) to investigate the characteristics of the vehicles themselves.

For this work the cars may be company-owned or hired, or may be the property of a member of the staff. When used for a test special instruments are installed and means provided for rapidly changing from one fuel to another.

Services

Overhaul and maintenance shops are equipped for the dismantling of engines for examination in detail after a test run, and also for the manufacture of special small parts as needed and for the maintenance of vehicles and engines.

A test stand for small 2-stroke engines

The tank-farm for the storage of test fuels comprises the following:

Number of Tanks For Storage & Supply	*Unit Capacity U.S. gal.*	*Total Capacity U.S. gal.*
1	5,000	5,000
2	3,000	6,000
4	1,000	4,000
4	500	2,000
3	250	750
For blending		
2	500	1,000

Fuel supply to the dynamometer building is controlled from a separate building, the feed lines from the tanks being connected to small pumps which convey the fuel direct to the test house. For the diesel fuels high pressure pumps are installed.

Office accommodation, conference room, and a useful library are located in the main building.

The Editor of the IP REVIEW is indebted to the many members of the staff of CCL who so willingly gave of their time to ensure that no question remained unanswered.

★ ★ ★

"MOTORWAY MANNERS"

Ernest Marples, the Minister of Transport, visited Shell-Mex House on 22 October to see, in company with other representatives of the Civil Service and the Press, a series of filmlets on the new motorways. He was welcomed in a speech by C. T. Brunner, a director of the Company.

Made by Shell-Mex and B.P. Ltd, in co-operation with the Ministry of Transport, the filmlets, each of only a few minutes duration, are to be shown on television. They demonstrate quite clearly, and in an amusing fashion, what to do—and most important what not to do—when driving on the new motorways.

The roadside picnickers, the motorist who tries to turn round in the middle of the motorway, and the driver who falls asleep at the wheel through boredom with the surroundings and with the "simplicity" of driving on the eternally straight road, are all presented with force.

After paying tribute to Shell-Mex and B.P. for their help and for their filmlets on road safety for children, the Minister also thanked the Company for their decision to award a trophy for the person who contributes most towards children's safety on the roads.

He said that the new motorways would require a new technique of driving which would have to be learnt. The main points in this new technique would have to be the maintenance of a steady speed, strict driving lane discipline, and care in overtaking.

The new filmlets, Mr Marples asserted, drove home such points far more successfully than either the printed or spoken word.

MILFORD HAVEN REFINERY

The work on the 4½ million tons a year refinery of Esso Petroleum Company, at Milford Haven, was begun in July 1958 and is now approximately 50 per cent complete. The refinery is scheduled to go on stream in November 1960, the project having cost about £18 million.

Designed to operate on Middle East crude oil, it will produce propane, butane, gasoline, turbo-jet fuels, autodiesel fuel, gas oil, and fuel oils.

The refinery site itself is on the north side of the Haven and is largely hidden in a bowl of land, being only visible from one direction on the landward side. The Company are taking immense trouble to supplement this natural advantage by industrial landscaping and design. The services of S. Colwyn Foulkes, O.B.E., F.R.I.B.A., the well-known consultant in this field, have been retained for this purpose. By careful siting, the majority of plant and tankage is hidden within a natural ravine; that which is exposed will be painted in varying colours to blend with the surroundings. Where possible, tree belts will be planted to afford a screen from the land side and the sea, and Forestry Commission consultants are advising on the chances of growing these trees successfully in the none-too-favourable soil.

The grading of the 350-acre site is virtually complete, and only the finishing touches are now required. In this work the contractors have moved in all about one million tons of earth, which has cost something in the region of £½ million alone. Approximately 7½ miles of roads are complete, and now await their final asphalt finish, whilst all sub-surface work on the site is also complete.

The Marine Terminal

Extending approximately 3500 feet into the deep waters of the Haven, in the shape of a "T", the marine terminal is headed by two outside berths taking tankers of up to 100,000 dwt at any state of the tide, and an inside berth for vessels of up to 5000 dwt. Small vessels can pass under the approach jetty, thereby minimizing movement difficulties. The marine terminal is constructed in concrete and supported by 915 piles. The whole structure is being pre-casted by the contractor, John Mowlem & Co. Ltd, in a yard on the edge of the refinery site, and assembled all together in the Haven. The pre-stressed, reinforced, cylindrical piles range from 22-27½ feet in diameter and from 35–140 feet in length, weighing up to 18 tons. A total of 100,000 linear feet of piling (some 19 miles) is necessary, and 90,000 feet has been cast to date.

An aerial view of the refinery site. Refinery units are under construction at right centre and at the extreme left centre is the pile casting yard for the jetty

The first tanker is expected some time during July 1960. It is thought that the terminal will receive two ocean-going tankers a week at first, with coastal tankers numbering about ten a week. It is further estimated that the loading or unloading time for the very largest tankers would be only 24 hours.

The Process Units

A pipestill with a capacity of 100,000 b.d.—the largest of its kind in the U.K.—will consist of a single-stage atmospheric pipestill together with gas compression, stabilization, and naphtha splitting facilities.

The furnace of the pipestill is the largest of its kind in the world, with a heat output of about 500 million Btu/hr. The 56 oil and gas burners are installed in two rows underneath the furnace. The reinforced concrete stack will be 300 feet in height to ensure adequate dispersal of flue gases.

The six towers, which range up to 200 feet high, are in various stages of completion.

Product streams will be cooled by 14 Air Fin cooler units, which will supersede the water cooling method. This does away with the handling problems created by having large volumes of water effluent as well as requiring a good deal less maintenance. The units consist of tubes with aluminium fins through which the oil flows. The fins are cooled by air supplied by four-bladed, 10-feet diameter, propeller-type, electrically-driven fans. These are almost complete, but since they will not be required before operation begins, they are being "cocooned" on site as a protection against the weather.

The hydrofiner comprises a fixed bed catalytic hydrogen treating process of Esso Research and Engineering Company design, employing hydrogen from the Powerformer. Most of the parts of this unit are in an advanced stage of completion. The three Air Fin cooler units, which are similar to those on the pipestill, have been completed and are being cocooned.

The work on the Powerformer, which is a new type, and also of Esso Research and Engineering Company design, has not progressed beyond the foundation stage, although much of the equipment is on site.

The light naphtha and turbo-jet fuels from the distillation plant will be treated in the copper chloride sweetening plant, which is only in an early stage of construction.

A boiler plant consisting of two Foster Wheeler boilers, each of 130,000 lb/hr at 150 psig and 450 F, will be installed to provide steam for process and power requirements. The boilers will be combination has and oil fired, either separately or proportionally. Work on these and the associated water treating plant has progressed little beyond the foundation stage as yet.

Tankage

There will be 68 storage tanks at the refinery, in addition to butane and propane spheres and storage drums. Forty of the tanks will be of the floating roof variety. Some of

the 30 tanks built up to October have already been hydrostatically tested and are ready for service.

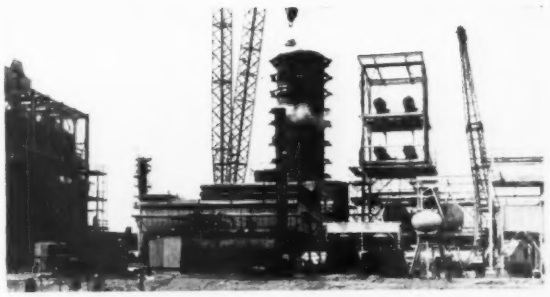
When completed there will be crude oil storage of 25,000 tons, with a capacity for 13 days supply.

A particularly unusual feature of the Milford Haven refinery tankage is the absence of bunds. In the event of a tank failure all oil is channelled to the skimming pond to prevent direct drainage to the Haven.

The skimming pond consists essentially of a "reservoir" in a natural ravine with a capacity of some 5-10 million Imperial gallons. All the refinery surface drainage water, and water which has been through the process unit separator, goes to the "reservoir". To remove any oil still present in this water the skimming pond is fitted with a dam and a skimmer. The clean water is pumped out through a 48-inches diameter effluent line into the Haven below the low water mark. Both the skimming pond and skimming box are complete.

All tankers coming to the refinery will discharge their ballast water into two 10,000-ton tanks. After settling, the contents of these tanks are discharged to oil and water separators.

To deal with any emergency release of gas which cannot be burned at the boilers or furnaces, a multi-jet ground flare is being installed. This is of Esso Research and Engineering design, giving 100 per cent combustion, in addition to being noiseless and non-luminous.



A general view of the distillation facilities, with the pipestill furnace on the left and the air fin cooler structure and fractionating tower in background

The construction labour force now numbers approximately 2300 and includes as much local labour as is available. The permanent operating force will number about 450, also being recruited locally as far as possible.

The civil buildings have been designed by Sir Percy Thomas & Sons, Cardiff, and the principal refinery contractors are Foster Wheeler Ltd, The Motherwell Bridge & Engineering Co. Ltd, Wm. Neill & Son (St Helens) Ltd, Whessoe Ltd, and Geo. Wimpey & Co. Ltd.

★ ★ ★

World Tanker Carrying Capacity Increases by 14 per cent

The recently-published seventeenth annual *Analysis of World Tank Ship Fleet* by the Sun Oil Company states that at the end of 1958 the world fleet of ocean-going tankers of 2000 gross tons and over totalled 3146, aggregating 56,640,700 dw tons. This was equivalent to 3403 T-2's.

WORLD TANKER FLEET AT 31 DECEMBER 1958
(Ocean-going vessels of 2000 gross tons and over)

Country of registration	*No.*	*Actual dw tons*	*T2-SE-A1 Equivalents*	
			No.	*Per cent of world total*
Liberia	417	10,940,500	700·1	20·6
United Kingdom ...	556	8,717,400	493·2	14·5
Norway	476	8,587,100	502·1	14·8
United States:				
Oil companies ...	205	3,833,100	241 2	7·1
Non-oil companies ...	123	2,349,300	146·8	4·3
Government	146	2,126,800	141·5	4·2
Total U.S.A.	474	8,309,200	529·5	15·6
Panama	195	3,810,000	232·4	6·8
France	122	2,462,000	150·0	4·4
Italy	128	2,245,400	133·3	3·9
Sweden	119	2,163,700	129·6	3·8
Netherlands	124	1,873,500	108·8	3·2
Japan	88	1,702,000	102·9	3·0
Denmark	59	1,082,300	64·9	1·9
West Germany	44	769,900	45·6	1·3
U.S.S.R.	58	586,300	28·6	0·9
Other	286	3,391,400	182·3	5·3
	3146	56,640,700	3403·3	100·0

In terms of carrying capacity the gain in 1958 over 1957 was 14·3 per cent, and compared with 1953, amounted to nearly 70 per cent. Tankers delivered during the year numbered 245, aggregating 6,922,500 dw tons. Almost three-fifths of the carrying capacity was registered under the flags of Liberia, Norway, and the United Kingdom.

Liberia was once again the leading country of flag registration at the end of 1958, although it is noted that 48 per cent of its tonnage was under U.S. control. The next three countries in descending order were the United Kingdom, Norway, and the United States. The last country has dropped below Norway compared with a year ago.

Supertankers (24,000 dw tons and over) accounted for approximately 38 per cent of the total carrying capacity of the fleet at December 1958 compared with slightly over 30 per cent at the end of 1957.

On 31 December 1958 known construction and orders numbered 803 ships of approximately 28·5 million dw tons, having declined in each quarter since the end of 1957.

The leading countries of construction at the end of 1958 were Japan, the U.K., Sweden, and Germany, which together accounted for 60 per cent of the total tonnage being built at that time. Almost half of the construction and orders were intended for registration in the U.K., Liberia, and Norway.

It is said that the recent tanker surplus will continue to grow during the next three years, but will diminish to some extent during 1962 and 1963.

The New Olefin Plant at Wilton

Largest Petroleum-Chemical Plant Outside U.S.A.

The Heavy Organic Chemicals Division (HOC) of Imperial Chemical Industries Ltd was created in 1958 to assume responsibility for the Company's main interest in basic organic chemicals which had previously been vested in the Billingham Division. With headquarters at Billingham, HOC controls the Olefin Works at Wilton and the Oil Works at Billingham, most of its production being based on petroleum. As Dr S. W. Saunders, its chairman, said during a recent visit by the technical press to Wilton, HOC is the largest petroleum-chemical venture outside the United States.

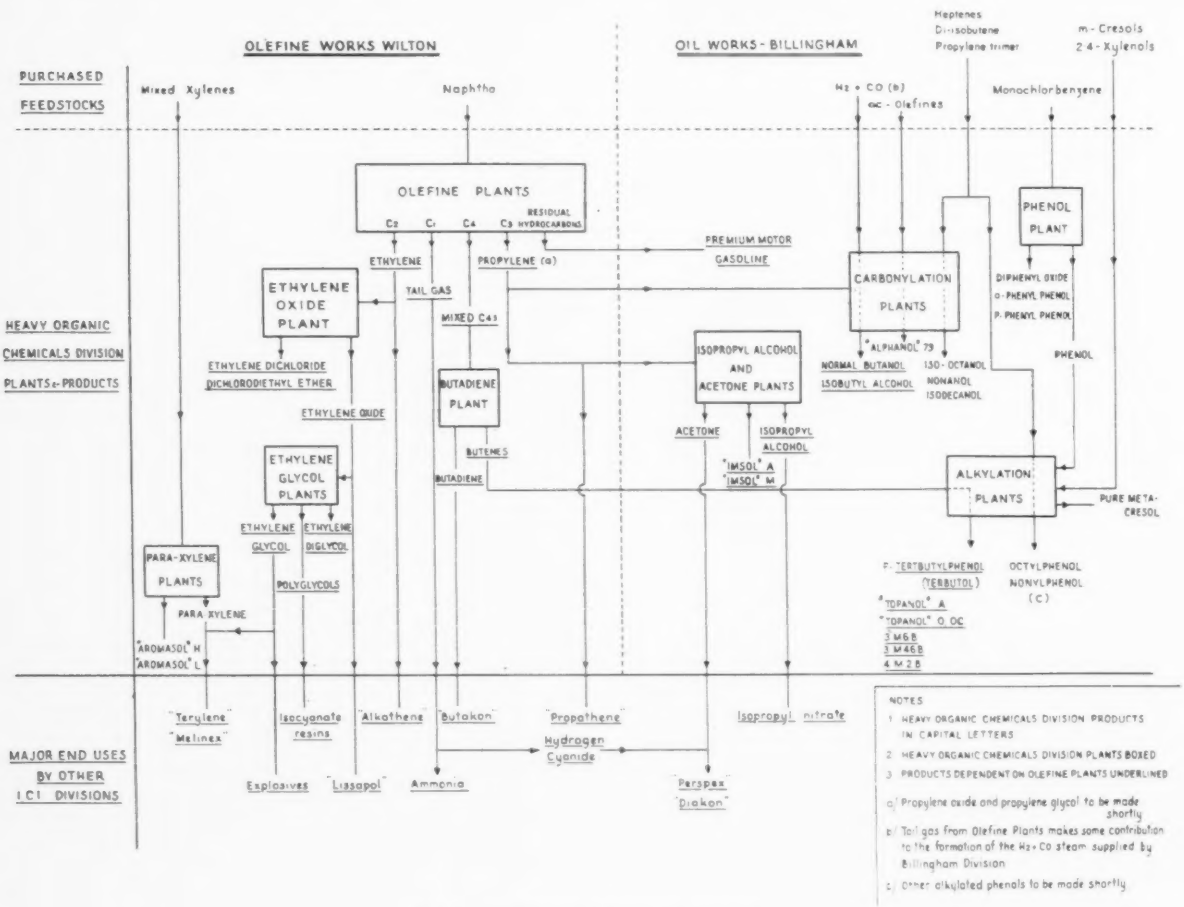
The purpose of the visit was to see the No. 3 olefin plant which came on stream in May last and which completes another phase in the Company's integrated plan for petroleum chemicals.

Capable of handling nearly one quarter million tons annually of feedstock, the total olefin capacity has been increased by 60 per cent to the current output of 110,000 tons per year. Total feedstock consumption of the three olefin plants is between 550,000 and 600,000 tons per year of light naphtha.

ICI and Petroleum Chemicals

Oil Works first produced petrol by the high-pressure hydrogenation of coal and coal tar creosote in 1935. As octane requirements increased, new plant and modifications to the original plant were added to make *iso*-octane and "Victane", two important aviation fuel components.

During the war, coal hydrogenation ceased but creosote



ICI Heavy Organic Chemicals Division

Main processes and products and their relationship to the olefin plants and to other main products of the company

hydrogenation increased. The latter continued until August 1958, when it become uneconomic. The experience gained in operating these processes, from working-up by-products, and from a vast amount of research had, however, provided a good foundation on which to develop Oil Works in the post-war era. Space limitations at Oil Works was one of the reasons why Olefin Works was located at Wilton. Since 1949 over £100 million has been spent at Wilton, half of it since January 1956, and only 600 of its 2000 acres have been so far developed.

Olefin Works at Wilton

During the war ICI realized the need for a reliable source of raw materials to meet post-war demands for such products as "Alkathene", "Perspex", and "Terylene". Ethyl alcohol and acetone from molasses were at that time the main raw materials, but molasses suffered wide fluctuations in availability and price. Petroleum was therefore examined as an alternative and much work went into planning a petroleum-chemical scheme not dependent on proximity to an oil refinery.

This meant that the feedstock should be a liquid petroleum fraction, and that gaseous intermediates such as ethylene and propylene should be used on plants within piping range. Also, liquid by-products should be usable or saleable without blending or other treatment.

Design and location of Olefin Works were carefully chosen and Wilton was selected as the site for various reasons. First, it was close to a deep-water jetty for large tankers; secondly, it had ample space; and, thirdly, it could be readily connected by pipeline to Billingham with its Oil Works, and the works of the General Chemicals, Plastics, and Dyestuffs Divisions of ICI.

Ethylene

High-purity ethylene is the chief product at Wilton and plans are under consideration to increase the present output of 110,000 tons to perhaps 140,000 tons a year by additions and modifications to the three plants. About 90 per cent of the ethylene is piped to the Plastics Division for making "Alkathene" grades of polythene. The remainder forms the starting material for ethylene oxide.

Polypropylene

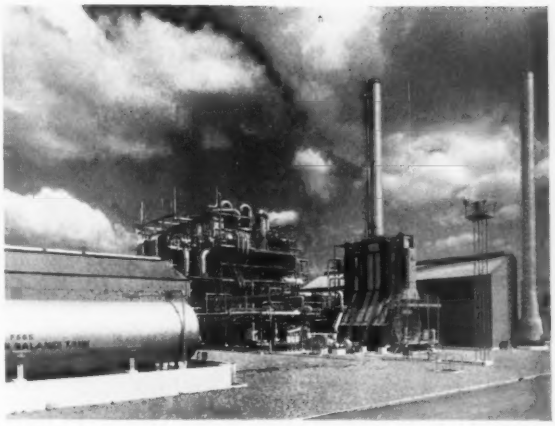
Part of the output of 95 per cent pure propylene is piped to Billingham for *iso*-propanol and butanols manufacture. Plant is being installed at Wilton for producing high-purity propylene for use in a Plastics Division plant for making "Propathene" grades of polypropylene.

Methane and "tail gas" go to Billingham for conversion (a) by General Chemicals Division into hydrogen cyanide; and (b) by Billingham Division into hydrogen and carbon monoxide.

After extraction of the butadiene, the C_4 stream is pumped to Oil Works for making butylated tar acids and for blending into petrol. Some of the C_3 and C_4 are sold as LPG. The petrol fraction is finished to oil companies' specifications and sold to them as premium grades. The heavy oil fraction and surplus gases are used as fuel.

Butadiene

A production of about 14,000 tons per year of butadiene is partly pumped to Plastics Division for making "Butakon" synthetic rubbers and leathers. The remainder is despatched to synthetic rubber manufacturers.



A pair of oil heaters and steam heaters, soaker lines, and primary fractionation equipment

Ethylene Oxide and Glycol

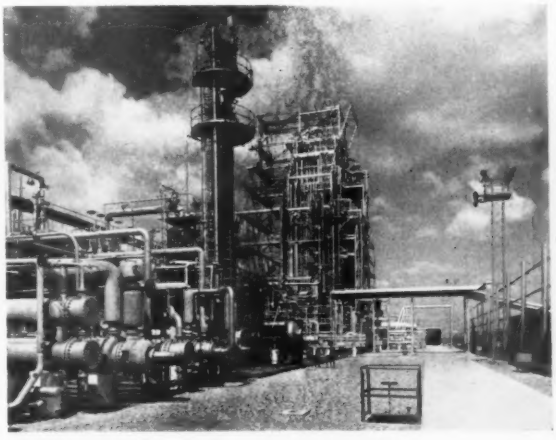
Ethylene not needed for "Alkathene" is converted into ethylene oxide by the chlorhydrin route. Plans for extension are in an advanced stage and a direct oxidation method may be used.

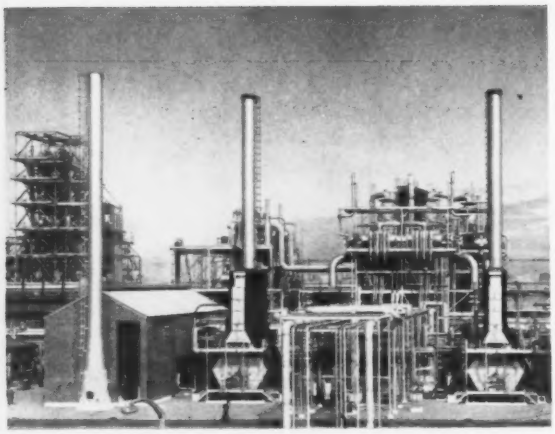
Part of the oxide is converted to ethylene glycol, one of the two main raw materials for "Terylene" manufacture for Fibres Division. Glycol goes to Nobel Division for use in explosives and is also used as an anti-freeze.

Ethylene oxide is also used for a variety of purposes, including "Lissapol" N, a synthetic detergent, while the by-products arising from its manufacture find widely different applications.

The Division has plans for making propylene oxide and propylene glycol on a large scale. These and diethylene glycol are used in making polyester and polyether resins by Dyestuffs Division, and particularly the polyurethane range of products.

Gas separation plant, also showing to the right the fire wall with steam lines and hydrocarbon gas safety ejectors





The No. 3 olefin plant

Para-xylene

Para-xylene is made from mixed ethylenes obtained from the oil industry to meet Fibres Division's needs for this material which, with ethylene glycol, is a starting material for "Terylene". The plant also isomerizes the *o*- and *m*-xylenes to give a higher yield of mixed xylenes than that obtained by other producers. By-products are sold as aromatic solvents.

No. 3 Olefin Plant

The process employed in the new plant is the same as that operated in the two previous plants, the first being commissioned in 1951 and the second in 1956. The process was developed by The M. W. Kellogg Company, New York, and the plant designed by them in collaboration with ICI staff and constructed by Kellogg International Corporation Ltd.

The Process

Feedstock at present is light distillate 2, a light naphtha obtained as a distillate from paraffinic crude oils and essentially a mixture of C_4–C_9 hydrocarbons. The plant can operate on a variety of light distillates.

The process is one of non-catalytic high-temperature thermal decomposition in which the maximum proportion of feedstock is cracked to produce gaseous products containing the maximum amount of olefins and, in particular, of ethylene. The desired conditions of cracking at low partial pressures and low residence times in the reaction zone is achieved in the Kellogg method of pyrolysis, where most of the heat of pyrolysis is supplied by mixing hot hydrocarbon vapour with steam at higher temperature. Most of the pyrolysis occurs in the soaker, a length of internally insulated pipe leading to the quench devices. Contact time is of the order of only one second. This arrangement permits high temperatures without risk of coke formation and high-octane gasoline can be separated from the liquid products. A further advantage is that the variation of steam : hydrocarbon ratio gives flexibility in product distribution and particularly in the ethylene : propylene ratio.

Products

Primary products are ethylene and propylene of high purity; methane; ethane; a tail-gas consisting of hydrogen and methane; butylenes plus butadiene; high octane gasoline; and fuel oil. The ethylene is produced at relatively high concentration and at a high ratio to ethane. Propylene and butadiene are in high proportion to propane and other C_4's respectively. The ethylene and propylene are conveyed by pipeline to the Billingham Oil Works for their next process.

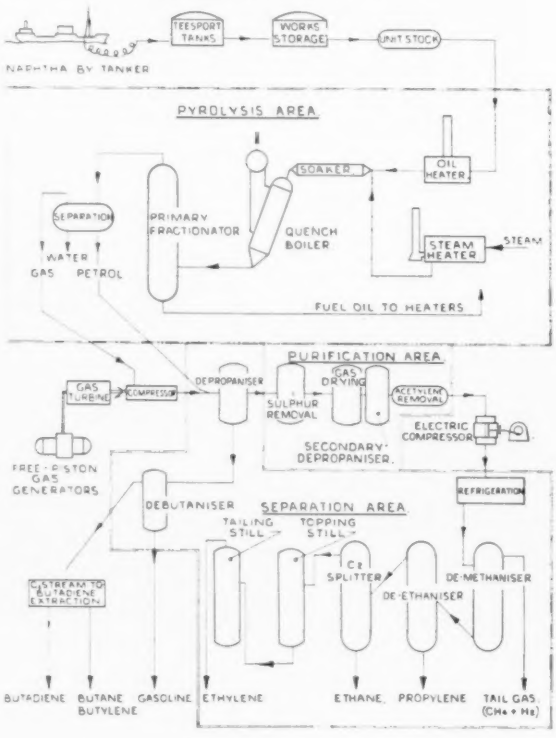
The Plant

Feedstock is unloaded from tankers at Teesport, where storage for about 24,000 tons is available. It is conveyed by pipeline to works storage at Wilton, where tankage for 16,000 tons is provided, and fed to the pyrolysis sections of the three olefin plants.

No. 3 olefin plant pyrolysis section comprises three independent parallel systems, each consisting of a tubular oil heater, a tubular steam superheater, soaker line, and quench boiler. In the latter, steam at 250 psig is generated as the reaction is quenched. The independence of each system provides flexibility in regulating pyrolysis conditions at various feed rates.

The pyrolysis products then enter the primary fractionator, where the small amount of heavy polymeric oil is separated for use as fuel oil. Condensed steam is also separated at this stage. The gas and crude petrol pass to the gas separation section which has a compression unit for process gas and refrigeration; a purification unit for removal of hydrogen sulphide, water, and acetylene from compressed process gas; a warm fractionation system for separation of petrol and butylenes plus butadiene; and a train of low-temperature fractionating columns for separation of light hydrocarbons.

Flow sheet of No. 3 olefin plant



Compression Unit.—A novel feature of this unit is the first industrial application of the free piston gas generator to drive gas expansion turbines and centrifugal compressors. The free piston gas generator is basically an opposed-piston two-stroke diesel cylinder, highly supercharged (50 psig) and generating hot gas (450 C) which exhausts at 40–45 psig. The exhaust gas is fed to the turbines to produce shaft power.

No. 3 olefin plant has a battery of fifteen generators designed and built by Société Industrielle Générale de Mécanique Appliquèe, of Paris, the object being to provide a high-efficiency compression plant at reasonable capital cost. They run on heavy fuel oil.

Purification.—Compressed gas purification is similar to that used in the older plants. Hydrogen sulphide is removed by caustic soda scrubbing, water content is reduced to less than 0·03 g per m^3 in driers using activated alumina dessicant, and a small quantity of acetylene is removed by catalytic hydrogenation.

Butylene and Petrol Recovery.—The warm fractionation unit gives two product streams—butylenes/butadiene and debutanized crude petrol. The first is caustic washed and passed to consuming plants and the petrol is combined with that from the other two plants for treatment.

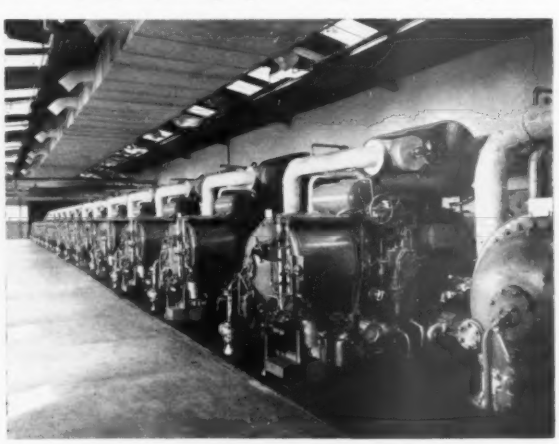
Light Hydrocarbon Products.—Separation from the purified gases of the methane, ethylene, propylene, and ethane is effected by low-temperature refrigeration and fractional distillation under medium pressures. While this is similar to Nos. 1 and 2 plants, some modifications have been incorporated in No. 3 plant. Thus, refrigeration is provided by a propylene compression system and a two-stage ethylene compression system in cascade with it. To reach the lowest temperature needed for separation of methane and lighter gas the methane product is let down in pressure and evaporated, thus eliminating a costly refrigeration stage and at the same time providing a new product at Wilton—nearly 100 per cent pure methane.

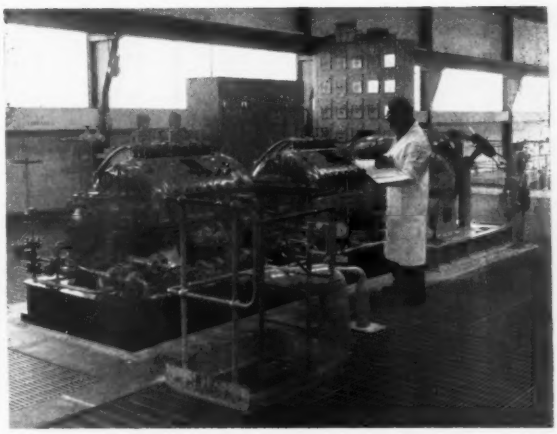
Automatic Control and Safety

No. 3 olefin plant operates on four shifts, each of 13 persons only, the number being governed more by safety than by operational necessity.

For the three olefin plants, 36 automatic analysis instruments transmit readings to the control rooms. The analysis

A battery of free-piston gas generators for driving compressors





Part of the installation of gas expansion turbines and centrifugal compressors

of simple hydrocarbon mixtures is carried out with British or American spectrometers. For more complex mixtures, a chromatograph or a chemical analysis method is used and for control analyses and product checking, modern instruments and automatic analyzers are employed.

Each olefin plant is surrounded by a fire wall and a blanket of steam can quickly be laid around them to disperse any major leakage of hydrocarbon vapours. Control rooms are pressurized to obviate risk of vapour accumulation and no process materials are led into them. Valves from control rooms are operated by remote control.

Oil Works at Billingham

The Oil Works of the HOC Division are largely dependent on petroleum, much of the raw material being piped from the Olefin Works. The plants comprise the following, capacity figures being transient as modifications are frequently made.

Synthetic Phenol Plant

Starting material is monochlorbenzene, and present output of about 15,000 tons per annum is being increased to 20,000 tons. A large proportion is used for manufacture of alkylated phenols and phenol-formaldehyde resins. Other uses include moulding powders and resins, and oil additives. By-products include constituents for fungicides, varnishes, heat-transfer media, and perfumes.

Alkyl Tar Acids Plant

There are a number of units ranging in capacity from a few hundred to over 10,000 tons per year. Raw materials include synthetic phenol, *iso*butene from Olefin Works, etc., and products are used in the manufacture of resins, detergents, and oil additives. The additives include anti-oxidants for petrol—di-tert-butyl p-cresol (4M26B) ("Tropanol" O), 2 : 4-dimethyl-6-tert butyl phenol (24M26B) ("Tropanol" A), and NN'di-sec butyl p-phenylene diamine ("Tropanol" M).

Alkylamines Plant

Two units make methylamines and one ethylamines, combined total output being between 2000 and 3000 tons annually. Raw materials are ammonia and ethanol from

Billingham Division and purchased ethanol. Product uses include pharmaceuticals, rubber chemicals, fungicides, and weedkillers.

Carbonylation Plant

Three units now in operation have a total capacity of about 60,000 tons per year, making the plant the largest of its type in the world. The process is basically the OXO process as modified by ICI research, and involves the addition of carbon monoxide and hydrogen to an olefin to give primary alcohols. Carbon monoxide and hydrogen are piped in from Billingham Division, propylene from Oil Works, and other olefins are mainly obtained from oil companies.

Products currently made have a host of uses, the principal outlet for *n*- and *iso*-butanols being as solvents and solvent intermediates. The plasticizer alcohols (*iso*-octanol, "Alphanol" 79, nonanol, and *iso*-decanol) are used in making phthalates used as plasticizers in polyvinyl chloride compositions.

Plans are in hand to extend the plant capacity and development work is being done on new products.

***Iso*-propanol and Acetone Plants**

The 45,000 tons per year *iso*-propanol azeotrope plant hydrates propylene from the Olefin Works to give the azeotrope of *iso*-propanol and water. Most of this is converted into acetone, the hydrogen produced passing to the carbonylation plant. The unconverted azeotrope is refined to give pure *iso*-propanol, which is sold as a solvent, as a de-icing agent for petrol, and as an intermediate. Nobel Division make it into *iso*-propyl nitrate, a monofuel for aircraft engine starters and an ignition improver for diesel fuels of low cetane number.

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Personal Notes

F. E. Wellings is retiring from the Iraq Petroleum and its Associated Companies at the end of the year, but is staying on at 214 Oxford Street in an advisory capacity. He has completed thirty years with them, twenty-one in the Middle East and the past nine in London.

F. E. Wellings

After taking Part II Geology in the National Sciences Tripos at Cambridge, Mr Wellings joined Shell in Mexico in 1921 as a field and well geologist for the Corona and Aquila companies. In 1929 he was transferred to the IPC in Kirkuk, where as senior geologist he located the subsequent twenty-odd wells required for the first pipeline. He was attached to headquarters in Haifa in 1933 and took charge of the exploration of the then transit countries of Palestine, Transjordan, Syria, and Lebanon. He was made deputy chief geologist in 1947, and chief geologist in London in 1952. Two years later he also became general manager, production operations, and for the past two years has been a member of the management committee.

Henry P. Wheeler, Jr, has been appointed an assistant director of the U.S. Bureau of Mines, to administer helium activities.

Mr Wheeler, former helium liaison officer, succeeds **Dr Clifford W. Seibel,** the internationally-known scientist, who has requested retirement after guiding the Bureau's helium programme for three decades.

Paul V. Mullins, formerly chief of helium operations, has been named general manager, helium operations, and will head field operations at five Government plants.

National Benzole Company Ltd announce that **G. W. Arthur,** a retail marketing representative in the Company's London Division, has been appointed district manager in Eastern Division.

D. K. Fraser, M.I.Mech.E., M.I.Mar.E., at present managing director of Petters Ltd, will be joining the board of G. A. Harvey & Co. (London) Ltd in the near future.

C. H. Flurscheim, B.A., M.I.E.E., M.A.I.E.E, a director and the chief electrical engineer of Metropolitan-Vickers Electrical Co. Ltd, has been co-opted to serve on the Council of the British Welding Research Association.

Mr Flurscheim began his career in 1927 as college apprentice with Switchgear Engineering Co. Ltd, and in 1936 was given control of the Company's high voltage division. He was appointed chief engineer following work on the development of electromechanical undercarriages and miniature circuit breakers for aircraft during the war. He became chief electrical engineer of Metropolitan-Vickers in 1957 and a director in 1958.

Edward A. Smith, B.Sc., F.C.S., M.Inst.Pet., has been elected to the board of directors of Acheson Colloids Ltd, who shortly celebrate the 50 years of their manufacturing activities.

Mr Smith was technical manager of the Company before being promoted to his present senior position of executive manager, Acheson Industries (Europe) Ltd.

E. A. Smith

A memorial service for the late **Archibald W. Lawson,** C.B.E., a former director of Shell-Mex and B.P. Ltd, was held at St Dunstan-in-the-West, London, E.C.4, on 16 October.

Mr Lawson, who was chief operating officer of the Petroleum Board during the war, was a director of Carless, Capel, and Leonard Ltd, International Paints Ltd, and Scammell Lorries Ltd, at his death on 26 September. He was 71.

The memorial service was attended by many of Mr Lawson's friends and associates in the oil industry.

Around the Branches

ABADAN, BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD, YORKSHIRE

Essex Branch

A meeting of the Essex Branch was held at the Railway Hotel, Pitsea, on 21 October, when G. A. Dickins, B.Sc., A.R.I.C., F.Inst.Pet., of Mobil Oil Company, gave a talk on "Some Impressions of the World Petroleum Congress 1959".

Mr Dickins indicated that the scope of his paper was very considerable and that in order to present his views in a short time he had selected only certain highlights of the convention. He gave a brief survey of the historical development of congresses of this nature and then dealt with the area covered by the papers, which numbered over 200, and gave some idea of the method of presentation of reports. As the field of petroleum technology increased and the international aspect became more important, changes in presentation, interpretation, and reporting would become inevitable. Even so, it was said the congress was a magnificent piece of organization for which full credit should be given to our American friends.

Mr Dickins then turned to the major portion of his paper, dealing with selected groups of papers. Standardization was one of the more important of these. Europe and the future of oil refining was covered in a genial and amusing survey, and Mr Dickins then dealt with the future of the African continent. Gasoline engines, atmospheric pollution, and the probable expansion of the fuel oil side of the petroleum industry concluded this section of Mr Dickins' talk.

With such a wide range of topics, the discussion was lively. It was opened by C. I. Kelly, who had attended all five World Petroleum Congresses. Standardization took up the major part of the discussion period, with gasoline fuels running a close second as a subject of debate.

The meeting concluded with a vote of thanks to the lecturer, who had covered so much ground in an authoritative and light-hearted manner.

Northern Branch

Autumn Works Visit—1959

A party of approximately 20 members of the Northern Branch visited the Trafford Park Works of Victor Blagden (Manchester) Ltd, during the afternoon of 29 September.

The party were shown round the Westinghouse Road Plant, where many types of 40-50 gallon steel drums are made. The processing of the steel was followed from sheet to finished drum, and particular emphasis was laid on the problems of providing a suitably-coated surface for handling corrosive materials and food products. An idea of the diversified uses of the standard steel drum was obtained and some of the special manufacturing techniques needed to overcome the problems involved were examined.

After tea, the party moved to the plant in Nash Road where some 20,000 drums per week are reconditioned. The progress of the drums was traced from reception, through washing, cleaning, de-denting, leak testing, internal inspection, repainting, etc., to dispatch. The special problems involved in handling heavily rusted, badly damaged, and open-ended drums were examined.

As the party broke up Mr Provest thanked the directors of Victor Blagden on behalf of the Branch, for providing a most interesting and informative visit.

Members of the Northern Branch at the works visit to Victor Blagden (Manchester) Ltd

Fawley Branch

Fawley Branch held its first meeting of the 1959-60 lecture season on 14 October, at the Esso Club, Holbury. S. A. Berridge, vice-chairman, was in the chair, and the speaker was P. D. Patterson, of the Dunlop Rubber Company.

Mr Patterson gave a talk on "Tyre Manufacture and Testing", which was well illustrated by slides, and supported by a film. The lecture not only covered the processes of manufacture and testing, but also illustrated the changes in equipment which have taken place as techniques have developed. The slides showed some interesting features of the most modern equipment which ensures the manufacture and testing of tyres to a high standard of accuracy and finish.

A second film featured the properties of tyres in use on the road. The talk was followed with much interest, and the discussion was opened by J. B. Godden. There were questions dealing both with aspects of tyre manufacture and testing, and some broader discussion on the future market for tyres and the type of tyre of the future.

The vote of thanks was given by A. E. G. Groombridge.

South Wales Branch

On 28 October 1959, H. E. Snow, C.B.E., deputy-chairman of The British Petroleum Company Ltd, repeated his address "Looking Ahead. On the Threshold of our Second Century", which he previously gave to the parent body on 4 March 1959.

This was enthusiastically received by a large audience and a number of interesting questions were asked. J. W. Martin passed a hearty vote of thanks, which was heartily applauded by those present.

Scottish Branch

The IP Scottish Branch held its inaugural meeting of the 1959-60 session in the North British Hotel, on 15 October.

Dr G. H. Smith, M.C., chairman of the branch, presided, and introduced the speaker, Dr T. F. Gaskell, whose subject was "Looking for Oil in the Persian Gulf".

The speaker said that at present there were three drilling rigs now operating offshore in the Persian Gulf in an effort to find oilfields which were the natural underwater counter-part of the gigantic reservoirs which exist both on the Arabian and the Persian borders of the Gulf, and in Iraq to the north-west. Although the search for oil at sea was carried out along similar lines to exploration on land, many interesting techniques had been developed to overcome the difficulties inherent in working in water.

It was not, of course, possible to make the normal geological reconnaissance of the rock outcrops, but a similar collection of surface information could be obtained by underwater swimmers, and by a modern type of powerful echo-sounder which could probe by means of sound waves into soft sediments that covered harder rock layers. It was also feasible to make gravity and magnetic measurements at sea in order to locate underground structures of the type that contain oil. However, there were no sign-posts at sea and special navigational aids, such as the Decca System, must be used to fix the position of the observations on the chart.

The geophysical tool that really found oil structures in detail was the seismic method, and this had been employed extensively in the Persian Gulf. In many ways it was simpler to do seismic work at sea than on land; there was no need, for example, to drill expensive holes for the explosive charges, because the sea formed an ideal medium for producing powerful sound waves; then again, the sea-surface formed a flat base-line so that the topography of the sea-bed was readily found by echo-sounders. In fact seismic measurements at sea could be made ten times as fast as similar measurements on land.

The bore-hole, which was the final arbiter for the exploration geologist, entailed a most expensive type of drilling. Although some success had been achieved by drilling from ships which were anchored in position, the bulk of offshore holes had been drilled from platforms. The design and handling of these drilling platforms raised many interesting engineering problems and the final completion of wells as oil producers brought with it special requirements, whilst in all these offshore operations a study of weather conditions was essential in order to avoid costly accidents.

At the completion of his talk, which was freely illustrated with film strips and slides, the speaker answered a number of questions.

* * *

SAHARA OIL AND TANKER DEMAND

A recent Westinform Shipping Report No. 144, of particular current interest is *The Possible Impact of Saharan Oil on Tanker Demand.*

The report is a preliminary investigation of the factors which will determine the effects on tanker demand of the development of oilfields in the Sahara. French official estimates have indicated a possible output of crude oil by 1965 of about 50 million tons, and it is likely that most of this will be marketed in Europe. This will depress the demand of tanker capacity but a number of factors will determine the actual extent of the saving in capacity.

The analysis proceeds by setting a hypothetical marketing pattern (in million tons of crude oil) against current imports which the Saharan oil may be expected to displace. The saving in tanker capacity is estimated by comparing the actual capacity used by current imports with the capacity which the new pattern of imports will take up.

The patterns of displacement used in this preliminary analysis are not intended to be taken as forecasts but are used to give a preliminary answer to a question which contains a formidable number of combinations of possibilities.

Separate copies of this Report may be obtained from W. G. Weston Ltd, 47 Piccadilly, London, W.1, at a cost of £2 each (postage extra).

Notes of the Month

SONJ–Humble Merger

Standard Oil Company (New Jersey) and Humble Oil & Refining Company announced on 1 October that the two companies have entered into a definitive plan for the merger of Humble into Jersey, subject to the necessary approval of shareholders. Jersey now owns 98·27 per cent of Humble shares. The plan provides that each share of stock of Humble other than shares owned by Jersey will be converted on the effective date of the merger into one and one-quarter shares of Jersey stock.

This merger is the first step in the previously-announced plan for the ultimate consolidation of all producing, refining, marketing, and marine operations of Jersey-affiliated companies in the United States for nationwide operation under unified management.

Marine Survey off U.K. Coast

Following the discovery of a limited quantity of oil at Kimmeridge, in Dorset, earlier this year, BP Exploration Company is carrying out a waterborne geophysical survey off the south coast of Dorset and the south-west coast of the Isle of Wight. This is the second water-borne geophysical survey that BP has carried out in this area, the first having taken place in 1956.

This operation, which started in the latter part of October, off the Isle of Wight, is slightly different from the first. Whereas the first survey was carried out by a specially-equipped vessel, the *Seislim*, the equipment for the present survey is being carried by two small locally-hired boats. It is hoped that the smaller boats will make it possible to operate slightly more closely inshore.

Offshore Drilling in Florida

Coastal Caribbean Oils Inc announced that the California Company has begun drilling operations 1½ miles off the coast of Franklin County in Gulf of Mexico tideland waters, on State leases held by a Coastal Caribbean subsidiary, Coastal Petroleum Company.

This well is the first to test the oil producing possibilities of offshore areas along the coast of north-western Florida, and is being drilled by the Standard Oil Company of California subsidiary under the terms of a 1955 agreement with Coastal for the exploration and development of approximately 4,500,000 acres of State bases on Florida's west coast. Under the terms of the contract, The California Company agreed to expend $10 million in exploration and drilling or to keep the leases in force for a period of eleven years, whichever first occurs. The drilling of the Franklin County well will earn The California Company a 50 per cent interest in a 10,000 acre block surrounding the drill site.

Scheduled to probe to a depth of 7000 feet, the well will test a seismic structure in St George's Sound about 11 miles east of Apalachicola.

The prospect to be tested is a seismic structural high located in what is believed to be a favourable Cretaceous stratigraphic trend. Objectives which will be evaluated in this well are sands of the Eutaw, Tuscalossa, and Paluxy, all of which are producing formations further to the west. It will seek production in sands which produce oil in nearby Alabama and Mississippi.

New Mobil Tanker Launched at Glasgow

The Mobil Acme enters the water at the launching ceremony

The 19,000-ton tanker, *Mobil Acme*, launched at the Linthouse yard of Alexander Stephen & Sons Ltd, Glasgow, on 3 November, is the latest of a series of new tanker launchings for the Mobil Oil International Group of Companies.

The *Mobil Acme* is the largest tanker built for Mobil in the United Kingdom since the war. Like her sister ship, the *Mobil Apex*, also building in the same yard, the *Mobil Acme* is a general-purpose turbine-driven single-screw tanker, constructed to enable her to load maximum cargo and still enter a number of limited draft harbours in the Mediterranean and West Africa where she will probably be used to carry refined products. The 27 cargo oil tanks have a total capacity of 860,000 cu ft, and seven different grades of product can be carried simultaneously.

In addition to the two vessels ordered in Glasgow, Mobil Tankships Ltd have five tankers, each of 50,000 tons, building at Gothenburg, Sweden, and three others, also of 50,000 tons, laid down at Bremen. The new tankers will be launched during the next five years.

Amongst those present at the launching were M. J. Schmidt, president of the Mobil International Oil Co., Sir Murray Stephen, chairman of Alexander Stephen & Sons Ltd, Parker S. Wise, Socony Mobil marine director, J. C. Gridley, chairman of Mobil Oil Company Ltd, Brandon M. Grove, chairman of Socony Overseas Oil Company Ltd, and C. Lawrie, director of Mobil Oil Company Ltd.

Oil Search in Nova Scotia

In an address to the Mineral Society of Nova Scotia in July, D. H. Stonehouse, who was until recently with the Nova Scotia Department of Mines, stated that during 1958 five major oil companies or exploration groups held licences to search for petroleum in sections of the province. He said that at East Side, Antigonish Harbour, one company had done some diamond drilling and others had concentrated on geological studies. He mentioned that a report on "Possibilities for Occurrence of Petroleum Reservoirs in Nova Scotia", by Dr W. A. Bell, had been published by the Department of Mines.

"Dracone" Tested in Nigeria

The *Dracone*, a sausage-like rubber-coated nylon container capable of holding 10,000 gallons of oil and being towed behind a tug, has been tested recently in Nigeria by Shell-BP Petroleum Development Company of Nigeria Ltd.

For its river towing trial the *Dracone* was unreeled into the water from pontoons moored at the Shell-BP loading base at Port Harcourt and about 9500 gallons of Diesolene pumped into it. The loaded *Dracone*, with four of its five feet diameter under water, was then towed by tug through the Bonny River and several creeks. Various tests and manoeuvres were carried out in the confined waters, the *Dracone* passing them all successfully. The cargo was eventually discharged into the tanks of a drilling barge and the empty container reeled up like a roll of cloth for the return journey to Port Harcourt. Sea towing trials took place later.

If further trials prove successful *Dracones* may be used to supply seismic survey parties with enough fuel to last them for three months at a time and also to supply fuel requirements and act as static tanks for the drilling barges being used in Nigeria.

"Esso Dublin" Launched in Italy

A 36,040 dwt tanker built for Esso Petroleum Company was launched on 4 October, from the Monfalcone yard of Cantieri Riuniti dell'Adriatico, Trieste. The new vessel was named *Esso Dublin*, and is the latest addition to the Company's tanker fleet—the eleventh of this tonnage in the current programme of tanker construction.

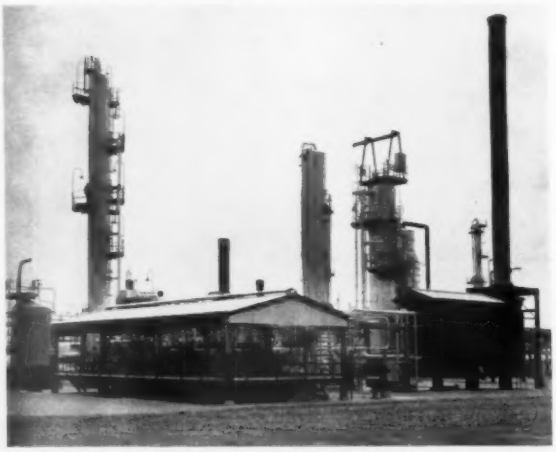
The *Esso Dublin* when commissioned will be engaged in transporting crude oil from Middle East ports to the Esso refinery at Fawley, the newly-completed Irish refinery at Whitegate, near Cork, and to the refinery now being built at Milford Haven. The vessel is 690 feet overall in length with a beam of 90 feet, and will have a loaded summer draft of 35½ feet. She will have a service speed of 17 knots and will be able to discharge her cargo in less than nine hours at a rate of 4350 tons per hour through four pumps.

Hydraulic Equipment Manufacturers Association

Many manufacturers in the hydraulic equipment industry have found the need for a central national organization to look after the interests of the industry as a whole; to collect and to distribute technical information; to advise on exhibitions for the industry at home and abroad; to encourage and to sponsor research for the benefit of the members.

To this end the British hydraulic equipment manufacturers have now formed their own association, The Association of Hydraulic Equipment Manufacturers, with offices at 38-40, Eccleston Square, London, S.W.1.

New Distillate Desulphurizer at Clarkson, Canada



A new distillate desulphurization unit of 8000 bd capacity recently went on stream at The British American Oil Company Ltd's Clarkson refinery. Canadian Kellogg Ltd, Toronto, a subsidiary of the M. W. Kellogg Company, New York, was contractor for complete design, engineering, procurement, and construction. The unit is designed to remove 90 per cent of the sulphur content in three charge stocks: fluid catalytic cracking light cycle oil, stove, and diesel base. It will be run in blocked operation with intermediate storage. Hydrogen will be supplied from reformer gas and a pelletized cobalt moly catalyst will be used. This unit has been designed by Kellogg so that capacity can be doubled with minimum changes. The addition of a second reactor equipped with its own separator and fractionator system will enable the unit to handle either two distinct feedstocks or double any one feedstock.

Tanker Launch in Italy

The third tanker to be built for BP Tanker Company by the Italian shipyard, Ansaldo SpA, was launched at Genoa on 20 September. A 35,000 dw tons vessel, it was named *British Signal*.

Bunkering Tanker Launched at Poole

An all-welded bunkering tanker, the *Esso Tynemouth*, was launched on 5 October from J. Bolson's shipyard at Poole.

The 700 dwt vessel, when commissioned, will operate from the Company's terminal at Tynemouth, and will be engaged in delivering bunker fuel oils to the ships which call in the Tyne-Tees area. She has been specially designed to give a high discharge rate to facilitate the rapid turnround of the ships she supplies in these busy areas.

BP's Southernmost Depot

BP's southernmost permanent storage depot was recently commissioned by BP (New Zealand) Ltd, at Bluff, the port for the city of Invercargill, at the southern tip of New Zealand's South Island. The depot, which has storage facilities for motor spirit and gas oil, includes tankage, loading lines for road tankers, and an office building.

The first BP tanker to discharge at the new installation was the 16,000 dw tons *British Splendour* with a cargo of motor spirit from BP's Kwinana refinery, Western Australia.

Anti-Locust Experiments at Sunbury

To find the best type of solvent base for an anti-locust spray, experiments on a large number of locusts are at present being carried out at BP's Research Centre at Sunbury.

This is the first time locusts have been used for experiments at Sunbury, although the effect on flies of various petroleum-based insecticides has been studied for some years. The present experiments are expected to last about six months and are being carried out on the African migratory type of locust, which is being bred at the Research Centre.

It is hoped that these studies will result in the production from BP's Grangemouth refinery of an improved type of solvent with which the insecticide component can be mixed. This mixture will then be sprayed on locust swarms and breeding grounds.

BP Bunkers U.S. Submarine

The United States Navy submarine Blue Gill *seen being bunkered with approximately* 50,000 *gallons of BP Diesoleum whilst on a goodwill visit to the port of Townsville, North Queensland, Australia*

Industrial Alcohols Plant at Lake Charles

The Lummus Company has been awarded the contract to engineer and construct an industrial alcohols plant at Lake Charles, Louisiana, with a capacity of more than 50 million lb/yr for Continental Oil Company. Scheduled completion date for the plant is early in 1961.

These higher alcohols will be manufactured by a new technique originally conceived by Dr Karl Ziegler, whereby organo-metallic catalysts are used to promote chain growth of ethylene followed by oxidation and hydrolysis to primary straight-chain alcohols containing an even number of carbon atoms.

With completion of the plant, these fatty alcohols will be available for the first time from petroleum rather than from the natural sources such as tallow fat and coconut oil from which they are now produced.

The primary raw material, ethylene, will be obtained from the ethylene plant operated at Lake Charles by Petroleum Chemicals Inc, of which Conoco owns a 50 per cent interest.

New UOP Refining Process

Universal Oil Products Company recently announced the development of a new petroleum refining process.

Trade-named *Merox*, the process is described as an inexpensive way of removing harmful sulphur compounds from a wide range of gasoline and light distillate oils. A catalyst of undisclosed type is used.

There are two major applications of *Merox*: it can be operated to remove mercaptans from gasoline and lower boiling fractions, in which case there is a reduction in the sulphur content of the material treated; or it can be used to sweeten stocks in which extraction is not of interest by converting the mercaptans to disulphides.

The new process can be used for either mercaptan extraction alone, whence it replaces conventional regenerative caustic washing, or sweetening alone, whence it replaces plumbite or copper sweetening, or it can perform both functions in a combined operation. The process, developed in UOP research laboratories, is available for licence to refiners immediately. Several commercial units have been in operation for periods ranging up to several months. Most of these represent conversions of existing treating facilities.

An important application of *Merox* in addition to treating motor fuel will be treatment of jet fuels. UOP pilot studies and commercial unit operations demonstrate that the process enables processing of a number of sour stocks to commercial and military jet specifications at low cost.

90 per cent Loan Schemes for Domestic Heating

A scheme to extend their present home heating service, and to bring water and central heating by oil within the reach of a wider public is announced by Mobil Oil Company. Through their *Mobilheat* distributors, Charrington Gardner Locket & Company Ltd and Associated Coal & Wharf Companies Ltd, Mobil will be offering 90 per cent loans for the purchase and installation of oil-fired domestic heating equipment. The loans will enable householders to have complete central heating in an average-sized house for about 30s. per week.

Both Charringtons and ACW will offer these extended credit facilities, in addition to the existing services already in operation, and will pay 90 per cent of the bill for the total installation including the cost of the equipment. Repayment can be effected over a period of from one to five years by agreement between the householder and the oil distributor concerned. No separate account with a finance company will be involved, and the agreement will provide for the loan being repaid at any time at the householder's option, as well as for free life insurance to cover the cancellation of the outstanding amount on the death of the customer.

Specialist staff will, at the request of householders, give personal advice in the home on the choice of suitable equipment.

In addition, the existing features of the Mobil home heating service will be expanded over a still wider area in the country.

Royal Institution of Naval Architects

It is announced that HM The Queen has approved that The Institution of Naval Architects shall henceforth have the designation "Royal".

Gas Council Report

The Tenth Annual Report and Accounts of the Gas Council has recently been issued, and covers the financial year ended 31 March 1959. Part III of the Report is devoted to a review of the Council's first ten years.

Research

The site preparation work at the Partington Production Station, which is to be a full-scale plant for the hydrogenation of oil or coal at high pressure, is well advanced. It is reported, however, that delays, which are inevitable with a new conception, have occurred in the design of the first stage of the development—the hydrogenation of oil.

When the plant has operated successfully on oil it will be adapted to use coal, which is the ultimate objective of the experiment. It may not be economic to hydrogenate coal completely, however, and it may prove preferable to carry out only the initial rapid hydrogenation leaving a coal char to be used. A tentative scheme is to gasify this with oxygen-steam in order to obtain the necessary hydrogen.

The experimental plant for the gasification of oil with highly superheated steam at the Stratford works of the North Thames Gas Board has been completed and has operated on gas oil under a variety of conditions. Yields of the order of one therm per gallon of oil have been reached, and at the same time some free carbon is produced.

Gas from Oil Refineries

During the year the North Western Board continued to take supplies of gas from the Petrochemicals plant, and the Manchester and Lobitos oil refineries, and the Southern Board took over 16 million therms of gas from Fawley refinery. The North Thames Gas Board completed the pipeline from the Coryton and Shell Haven refineries to Romford gasworks. Gas purchased and refined from oil refineries totalled 49·8 million therms.

Gasification of Oil

During the year under review the Council decided that much of the work that had been conducted at its research stations on new processes for gasmaking had reached a sufficiently advanced stage for it to be developed commercially. With this in view the Council has entered into agreement with Woodall-Duckham Construction Co. Ltd, Humphreys and Glasgow Ltd, Henry Balfour and Co. Ltd, The Power-Gas Corp Ltd, Simon Carves Ltd, and West's Gas Improvement Co. Ltd, who are licensed to build commercial plants at home and abroad covering developments relating to the production of gas from coal or oil under a pressure of several atmospheres. These companies will co-operate in process development to the pilot plant stage, and may then each produce its own version of the plant on a commercial scale.

	Light oil	*Gas oil*	*Heavy oil*	*Total of oil used*	*Oil gas made*
	tons	*tons*	*tons*	*tons*	*therms*
1957–58 ...	4,500	1,300	59,900	65,700	16,231,000
1958–59 ...	14,800	17,100	112,900	144,800	41,565,000

At the beginning of the year the daily capacity of oil gasification plants in being was 57 million cu ft. During the year a further six plants were completed, and the total daily capacity by the end of the year was 128·5 million cu ft. The quantities of oil and the amount of gas made from these during the last two years can be seen in the table at the foot of the previous column.

In the Isle of Grain project for the gasification of oil feedstocks the *Segas* plant was completed and the first of four gas-making streams was put into operation. Work on the next stage of the project is proceeding and is planned to raise the capacity of the works to 42 million cu ft/day.

Importation of Liquefied Natural Gas

The Council's Report for 1957-58 gave a full account of the experimental importation of liquefied natural gas by sea and the review announced the completion of the first trial voyage. At the time of writing of the 1958-59 report two more trial voyages have been successfully completed, and further ones are to be made.

Natural gas in its liquid state contains approximately 530 therms ton. After allowing for losses during the voyage and conversion processes, the net quantity of gas available is about 480 therms ton. Thus the equivalent capacity of the trial shipment of 2000 tons is a little short of one million therms. Such small shipments are held to be uneconomic and consideration is now being given to importing methane on a large scale.

At a Press Conference when the Report was issued, Sir Harold Smith, chairman of the Council, said that an early decision would be taken on whether two 10,000-ton or one 20,000-ton tankers would be built for the transport of liquefied methane. In thirteen or fourteen scheduled trips a year these vessels would carry the equivalent of two million tons of coal in a year.

Referring to the *Methane Pioneer*, Sir Harold said that it had made five voyages carrying 2000 tons of methane and that seven other voyages were planned. The Gas Council's half-share of the original ship was £1,200,000.

Natural Gas

Results of the search for natural gas have been disappointing and, after a reassessment, the Council has decided to continue the search on a limited scale. It is also to increase its investigation into the possible geological formations in Britain suitable for the underground storage of gas.

Throughout the year the Scottish Board continued to take a small regular supply of natural gas from the Cousland well into its works at Musselburgh. This was in the nature of a production test to assess the potential output of the well. Estimates of natural gas at Cousland vary greatly from 250 million cu ft to 3000 million cu ft, but the comparatively small amount of gas extracted since October 1957 (36 million cu ft) has not enabled a firm estimate to be made.

To assist in obtaining this information, a second well is to be drilled during 1959-60.

Another deposit of natural gas has been proved at Calow, in Derbyshire. The size of the reserve is thought to be small but a further well is to be drilled either in 1959-60 or early 1960-61.

New Supertanker Jetty on the Mersey

Shell's Installation at Tranmere

A new oil terminal at Tranmere, on the River Mersey, for the handling of tankers of up to 65,000 dw tons is being developed jointly by Shell Refining Company Ltd and the Mersey Docks and Harbour Board.

Since Shell's refinery at Stanlow was started nearly 40 years ago its feedstock has been imported through Stanlow Docks, about 4½ miles from the entrance to the Manchester Ship Canal. When the refinery capacity was greatly increased after the war, the Queen Elizabeth II Dock at Eastham was built to take tankers of 30,000 dw tons. Now, the use of much larger vessels by Shell calls for accommodation for tankers and other vessels up to 65,000 dw tons. The Tranmere facilities, about 9 miles north-west of the refinery, will provide this. Jetties and moorings are being provided by the Board and the tank farm and pipelines by the Company.

The project has presented many unique and complicated engineering problems, not the least of which was associated with the difference between low- and high-water levels at Tranmere. This could have involved a vertical movement between a fixed quay and a large tanker of up to 60 feet, 30 feet being for tidal range and 30 feet for pumping differential.

Tankage Installation

Of the levels at which the site could be constructed, there were two principal possibilities, the low level scheme being near to the existing rock level with watertight walls, or a filled site above high water. The requirement that there should be no leakage of oil into the river made the low level scheme economically attractive.

An area of 32 acres has been reclaimed from the bed of the Mersey by a limestone rubble wall with a 6-inch thick prestressed concrete plank diaphragm wall grouted into a concrete beam cast into the rock.

The site, which is divided into two sections, is founded on sandstone rock covered in parts by clay, and the original surface was river silt of varying thickness. The silt will be removed from the tank compounds, and foundations for six floating roof tanks will be built of crushed sandstone topped with sand bitumen mix. These compounds will be divided so that the total oil content in any bunded area does not exceed 39,000 cubic metres and the bund capacity will be 110 per cent of the tank capacity. The drainage from each tankage area will be controlled by hand-operated valves and all liquid from the working areas will pass through an interceptor, the effluent from which will be pumped to the Mersey.

In the southerly compounds a fuel oil tank of 15,000 cubic metres will be used for bunkers for tankers using the terminal.

Tanker Accommodation

The forked approach jetty is mainly of reinforced concrete construction, precast wherever possible, though steel has been used wherever bearing piles have been required. It will provide a roadway, footpath, and pipetrack to two jetty heads, which will be large enough to accommodate flow boom equipment for ship-to-shore pipe connexion, fire pumps, and vehicle turning space. The flow boom equipment will comprise six 12-inch arms for hose handling, four being for crude discharge and two for fuel oil, all being power operated and controlled from an elevated cabin on the boom gantry overlooking the tanker deck.

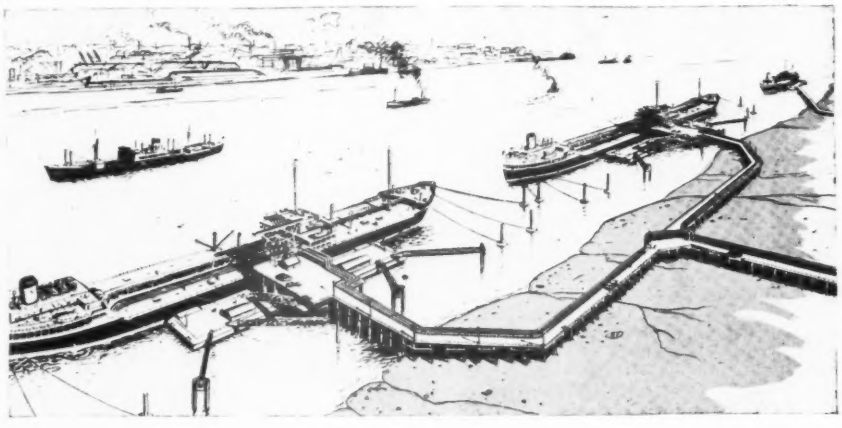
Each tanker will be moored to six circular pontoons, each with a central hole through which a 5 ft-5 inch outside diameter Mannesmann steel tube passes to act as a central guide up and down which the pontoon floats with the tide. These tubes are grouted in holes drilled in bedrock and have been designed to resist a horizontal pull of 150 tons at high water, the largest of them being 130 ft in length and weighing over 100 tons.

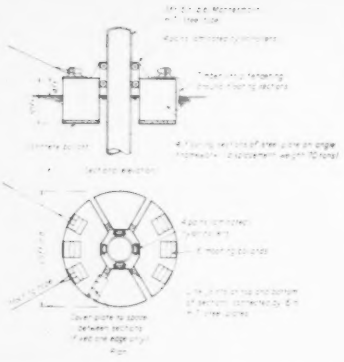
The tanker will be alongside a floating stage, 366 ft long by 62 ft wide, the deck structure incorporating deep longitudinal girders supported by a series of individually removable transverse rectangular steel pontoons, and the berthing face being protected by sprung fender beams faced with rubber cylinders. The freeboard will be 8 ft 6 inches and the total displacement almost 2000 tons. Each stage will be anchored by four 150-ft long steel booms through trunnion and pivot connexions to heavily loaded ballast boxes suspended by links from pairs of Mannesmann tubes, also of 5 ft 5 inch outside diameter and grouted into bedrock. Each end of the stage acting via one pair of booms has been designed to absorb at least 350 ton/ft of kinetic energy and the whole stage to resist a side wind load of 375 tons. Access to each stage is by means of a footbridge.

The jetty head platform projects over the stage, being cantilevered forward from four 5 ft diameter prestressed concrete cylinders which pass through an opening in the centre of the stage, the face of the platform being located 17 ft 6 inches back from the berthing face in its normal low water position to allow for the backward movement of the stage under wind load and berthing impact. The flow boom equipment will allow for a vertical movement of the ship of 70 feet, the tidal range at spring tides being well over 30 feet.

The berths are being dredged to give a depth alongside

An artist's impression of the project as it will appear when completed





Details of the fabricated steel mooring pontoons

of 40 feet at low water spring tides, involving the removal of a large quantity of rock in addition to softer material.

To connect the Tranmere site with Shell's existing crude facilities at Eastham, a 24-inch pipeline is being laid. This leaves the south-east corner of the site and is laid in the foreshore to a tunnel 80 ft deep and 240 ft long under the Bromborough Dock Lock. From there the route is on land via the south reclamation, river bank, and Power Road to Eastham Woods.

The requirements for which the scheme has been designed are:—

Tanker size	65,000 tons
Crude discharge rates ...	4,000 cu m/hr average 7,000 cu m/hr max.
Fuel oil discharge rate ...	3,000 cu m/hr average
Fuel oil loading rate (bunkers)	350/700 cu m/hr
Crude transfer rate to Stanlow	1,300* cu m/hr.
Crude storage capacity ...	115,000 cu metres
Fuel storage capacity ...	15,000 cu metres

* with possible increase to 2,500 cu metres

Pump Capacities

3 Main crude (Mather & Platt) ...	650 cu m/hr at 1200 ft head 1100 hp.
1—Crude transfer (Pulsometer) ...	500 cu m/hr at 50 psig, 100 hp.
1—Crude drain	50 cu m/hr at 50 psig, 10 hp.
2—Bunker	380/0/380 cu m/hr at 250 ft, 200 hp.

These are constant pressure pumps with reversible flow for line clearing.

Boilers

2 Cradley hot water, each of 7,500,000 Btu/hr capacity.

Tankage Installation

Consultants	Sir Bruce White, Wolfe Barry & Partners.
Main site civil contractor	A. Monk & Co. Ltd.
Pipeline principal contractor	Sir Alfred McAlpine & Son Ltd. (*Pipework:* Constructors John Brown Ltd.)
Site oil pipework	George Wimpey & Co. Ltd.
Site firemain	Sulzer Bros. (London) Ltd.

Tanker Accommodation

The work of constructing the tanker accommodation to the joint requirements of the Mersey Docks and Harbour Board and Shell Refining Co. Ltd, is being carried out under the supervision of the Board's Engineer-in-Chief, J. D. J. Saner, M.C., M.I.C.E., by Peter Lind & Co. Ltd, as main contractors, with The Cleveland Bridge and Engineering Co. Ltd as sub-contractors for the stages and mooring pontoons. The dredging is being carried out by the Westminster Dredging Company under a separate contract with the Board. The Mannesmann tubes were supplied by Mannesmann-Export GmbH of Dusseldorf.

Scottish Half-Year Oil Consumption

Deliveries into inland consumption of petroleum products in Scotland during the period January–June 1959 rose by 127,974 tons over the first half of 1958, according to figures released by the Petroleum Information Bureau on behalf of the Petroleum Industry Advisory Committee.

Within the 1,491,449 tons delivered in the 1959 period, increases were achieved for every product apart from vaporizing oil, paraffin wax and scale, and "other products". In contrast to the trend in the U.K. as a whole, aviation fuels consumption rose considerably, as did the use of bitumen which is likewise a continuance of a recent upward trend.

Of the motor spirit increase of 14,602 tons, premier grades increased their contribution by 21,558 tons to counterbalance the drop of 6956 tons in standard grades.

Details can be seen in the following table:

SCOTTISH DELIVERIES INTO INLAND CONSUMPTION OF PETROLEUM PRODUCTS

	January to June			
	1958		1959	
	tons		*tons*	
Aviation fuels		61,044		85,800
Motor spirit (incl. motor benzole)				
Premier grades ...	133,055		154,613	
Standard grades ...	111,735		104,779	
		244,790		259,392
Industrial spirits (incl. industrial benzole) ...		22,300		22,354
White spirit		3,990		4,082
Kerosine:				
Burning oil	42,499		42,751	
Vaporizing oil ...	25,255		19,836	
		67,754		62,587
Derv fuel		114,901		123,658
Gas, diesel, and fuel oils:				
Gas diesel oil	161,364		175,080	
Fuel oil	323,753		364,800	
Refinery consumption	126,293		141,482	
		611,410		681,362
Lubricating oils and greases		35,784		36,067
Paraffin wax and scale ...		2,114		1,708
Petroleum gases ...		5,380		6,232
Bitumen		72,280		88,268
Other products		121,728		119,939
		1,363,475		1,491,449

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6th International Congress on Combustion Engines

At a meeting of the Permanent Committee of the International Congress on Combustion Engines (CIMAC) held in Paris in October, delegates agreed that the next Congress will be held in 1962 in Copenhagen. The theme for the Congress will be: "Recent Developments with Diesel Engines and Gas Turbines above 3000 hp per engine and with Gas Engines above 1500 hp per engine."

Full details concerning the actual dates and instructions to authors intending to submit synopses of papers will be circulated by the British National Committee as soon as these are available.

"Pioneers of Petrol"

In the historic oil year of 1859 a middle-aged chemist by the name of Eugene Carless came to Hackney Wick—then a small country hamlet to the east of London—with the intention of setting himself up as a distiller and refiner of mineral oils. The business he set up there, later known as Messrs Carless, Capel & Leonard, is the subject of a recent book* which reviews in an absorbing fashion the history of this company and, through it, of the early days of the oil industry in Britain.

Carless built his Hope Chemical Works at Hackney and brought into partnership a young businessman called William George Blagden. Carless had studied James Young's developments in the field of distillation of bituminous shales and the production of shale naphtha from the further distillation of the burning oil thus obtained, and soon became one in the pioneers in the deriving of benzine from this shale naphtha. The benzine was used in naphtha flare lamps and in dry cleaning processes.

In refining naphthas from the Scottish shale deposits, fractional distillation was used to remove the highly-inflammable lighter-boiling portions and the resultant oil was sold for burning to provide light and heat.

In the early 1860's the firm were also the pioneers in the production of 0·680 Spirit, which they called Carburine, for use in the early carburettors. The fluid and the carburettor were sold for the specific purpose of enriching ordinary gas supplied to churches and other large buildings. This was first introduced in 1864—two years before the date generally accepted to be that of the first use of carburettors.

Among the range of cleaning spirit introduced by the Company at the time was *Apokathartikon*, which is still sold in small quantities to-day.

In 1870 the partners dissolved their association amicably, Blagden becoming a petroleum broker, and being succeeded by George Bligh Capel, who was able to put some capital into the business.

The Company's range of activities was now rapidly expanding and the works became the leading distillery in Britain for the new imported crudes from the U.S.A. Advances were also made in the refining of coal-tar and shale material, whilst the sales of products already marketed rose steadily.

In 1872 the association between Carless and Capel was dissolved and a new partnership was announced between Capel and John Hare Leonard, a member of a Bristol business family and a man of first-class business ability, under the name of Carless, Capel & Leonard. Carless left the partnership and became works manager.

A letter from Capel to Leonard shortly before this throws an interesting light on the business. He writes that "the firm's ascendancy in the trade was due to the enormous number of Sponge Lamps sold, and so greatly appreciated by the poor, also the number of uses our Highly Rectified Spirit of various gravities is now being applied to for increasing the illuminating power of gas, for forming gas of itself, for dyers' and cleaners' uses, for varnish making, etc, etc. It is a branch of the trade which will probably be always in a few hands, as many men, not understanding its peculiarities and exaggerating its dangerous qualities, do not like to add it to their other businesses". Being the largest petroleum importers in Britain they also supplied other distilling companies with the imported oil.

The entry into the business of J. H. Leonard was a turning point in its career. Within eighteen months he became the sole proprietor of Hope Chemical Works, leaving Capel as entire owner of the match factory which they had established as a business sideline. Leonard brought his sons into the business and, amongst other early moves, further developed the firm's associations with the cleaning trade.

A list of products of the Hackney Wick factory issued in the 1880's shows the wide variety of their products at a time when American petroleum and British coal tars were the only materials readily available, and before the advent of petroleum as a source of motor power. The list includes rectified benzoline; refined benzoline (specific gravity about 0·700 and used for dry cleaning and illuminating the sponge and the later wick lamps); petroleum oil (specific gravity about 0·795, for use in wick-fed lamps); paraffin or coal oil; burning naphtha; autoline; benzine (specific gravity 0·730, for dry cleaning and manufacture of oil cloth or varnish); and gasoline (specific gravity 0·650, for increasing the luminosity of coal-gas).

The advent of imports of petroleum from Russia in the nineties led to the appearance of solar oil in Britain, distillates of which were found to be particularly suitable for increasing the luminosity of gas—at a time when competition was beginning from electric light. By the end of the century Carless, Capel & Leonard were the leading suppliers of oil to the coal-gas industry.

The swiftly-increasing imports of petroleum to Britain and the development of the industry in the country greatly favoured the importance of Hackney Wick as an oil-refining area, being close to Bow on the Lee Navigation Cut, whereby supplies could be brought up by water from the Thames. The main line railway goods depots were also conveniently near. The formation of the London & Thames Haven Oil Wharves Ltd under the impetus of the new Thames Conservancy regulations prohibiting the carriage of low flash petroleum by water beyond Mucking Light likewise greatly benefitted the Hackney firm, which used some of the Thames Haven storage facilities.

In 1894 Carless, Capel & Leonard expanded its interests by buying up the petroleum importing, dealing, refining, and distilling business of Léon Clerc and his Pharos Oil Works, also at Hackney Wick.

The passing of the Locomotives on Highways Act 1896 brought to the fore the motor car as a form of transport in Britain, which soon necessitated the development of a new and improved fuel. It is in this connexion that Carless, Capel & Leonard are probably best-known.

A young engineer, Frederick Richard Simms, a personal friend and business associate of Gottlieb Daimler, decided to import the latter's gas-oil engines for use in the launches which he intended introducing on British waterways. The lack of a spirit of high volatility for internal combustion engines led Simms to consult Carless, Capel & Leonard, who soon proceeded to provide him with regular supplies of "Launch Spirit", a deodorized petroleum spirit of 0·680 specific gravity.

With the firm's regular trade with Simms in this product it was thought necessary in January 1893 to give it a distinctive

* "Pioneers of Petrol. A Centenary History of Carless, Capel & Leonard 1859–1959", by Edward Liveing, M.A. Published by H. F. & G. Witherby Ltd.

name. Simms suggested calling it "petrol". Leonard at first objected to this on the grounds that it was too much like petroleum, the trade name for paraffin oil, but later relented. A pamphlet was then drawn up by the Company, which gave the spirit its new name. Previously the spirit for the launches had been called "Launch Spirit" or "Deodorized Petroleum Spirit, S.G. 0·680", but ever afterwards the firm referred to it as "Petrol", thus fairly claiming to have introduced the word.

Leonard himself wrote in later years that as soon as motor cars were introduced he realized how important the sale of petrol was likely to become and did his best to protect the word by registration as a Trade Mark. "Unfortunately the Registrar of Trade Marks would not admit it on the ground that it was a descriptive word and as the law then stood, although a new word, it could not be registered. It was recognized, however, that the word was ours, and on this ground I got the Anglo-American Co., and afterwards our other competitors, to call their motor spirit by other names".

Almost certainly, it can be said that Carless, Capel & Leonard were also the first refiners in Britain and Europe to make on a commercial scale a petroleum product fully deodorized and doubly distilled of such light specific gravity.

From that time onwards the Company were forerunners in the development of petrol for the motor car, being greatly concerned in some of the earliest motor trial runs and shows, and the campaign to induce the railways to put in force reasonable rates for the conveyance of petroleum spirit. They were in addition pioneers of petrol distribution.

In another sphere of activity Carless, Capel & Leonard were the first to apply specialized petrol for the new "submersible" craft of the Royal Navy, in 1901.

In later years the Company were one of the forerunners in bulk distribution of petroleum. Between the world wars, in conjunction with Low Temperature Carbonisation Ltd, they were pioneers in the production of oil from coal. Some of this oil was used in large quantities for the fighter planes of the Royal Air Force and the Royal Naval Air Service, and later was sold from the pump to motorists as "Carless-Coalene".

In the years after the second world war the Company took part, together with other distillers and refiners, in the development of chemical by-products from petroleum, and synthetic resins and plasticizers soon became normal end-products from the materials made at Hackney Wick.

At the beginning of 1949 Carless, Capel & Leonard became a private limited liability company, after having been run on a partnership basis for 90 years—in itself a unique and extraordinary record in the extremely competitive and ever-expanding trade with which it had been concerned.

To-day, Carless, Capel & Leonard play a relatively smaller role in oil operations in Britain. Nevertheless, as the Company's present managing director has said: "There are many chemical processes and products which are not suited to large-scale operations, and for obvious reasons, they make ill-assorted bedfellows with chemicals required and produced in gigantic quantities and having international markets on a very large scale".

So long as there is a demand for certain products of a specialist nature in small quantities so will there be the need for such a firm as Carless, Capel & Leonard—who can surely claim with justification the title of "Pioneers of Petrol".

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Books and Films

Fire Risks in Motor Vehicle Servicing

The Fire Protection Association's Technical Information Sheet *Fire Risks in Motor Vehicle Servicing* No. 1011 deals with the special problems facing garage owners. The danger of explosions caused by the ignition of petrol vapours and the conditions under which such explosions may occur are discussed in detail. The hazards associated with the use of cellulose paints for spraying purposes are described, and in particular the use of a separate building is recommended for this process; special attention is paid to the heating of the spray rooms. Information is also given on fire fighting equipment suitable for use in garages.

A copy of this technical information sheet can be obtained free of charge on request to the Fire Protection Association, 31-45, Gresham Street, London, E.C.2.

PIB Wall Map

The latest of the wall maps of world oil operations, measuring 40 × 30 inches, issued by the Petroleum Information Bureau, 29 New Bond Street, London, W.1, is now available. Figures of crude oil production and refining capacity for various countries for 1958 are given, both in the attendant tables and in symbol form on the map itself (in metric tons). In addition, charts give graphic representation of U.K. imports of crude oil and refined products, by countries of consignment, in 1958 and the growth of world oil production by geographical areas 1900-1958.

Copies are available from the Bureau, price 2*s* each, post free.

British Standards

Test code for gas turbines

Performance guarantees given by manufacturers of gas turbines may now be verified by means of BS 3135 : 1959. It corresponds in general form to BS 752, *Test code for acceptance tests for steam turbines* and, like that standard, will eventually be associated with a "sister" specification. The standard for gas turbines will cover such matters as standard rating, temperatures, ambient conditions, governor performance, starting characteristics, and pressure tests. These are not therefore specified in the present test code, which contains only such definitions and recommendations for procedure as are necessary for testing gas turbines, gas turbo-generators, gas turbine-driven compressors, or gas turbine-driven pumps.

In addition to a general section containing definitions of terms, the code contains a section referring to preparation for tests, instrumentation, methods of measurement, conduct of tests and evaluation and reporting of results, and appendixes referring to methods of conducting acceptance tests, and a note on calorific values.

Copies of this publication may be obtained, price 7*s* 6*d* (postage extra to non-subscribers).

Emulsion spraying machines for roads.

This publication, BS 3136: 1959, issued as a counterpart to BS 1707, *Hot binder distributors for road surface dressing*, deals with both mobile and transportable machines for pressure-spraying emulsions, operated either by hand or

mechanically. Essential characteristics of tanks, feed and distribution systems are also specified.

An important feature of the standard is a stringent test for the uniformity of transverse distribution of emulsions. The requirements are applicable to both new and used sprayers, and the regular testing of machines should result in a high standard of performance in service.

Copies may be obtained from the BSI Sales Branch, 2 Park Street, London, W.1, price 4*s* 6*d* (postage extra to non-subscribers).

Study of Small Garage Businesses

An unusual and interesting study of one facet of the problems of small business is provided by a new publication emanating from the U.S. Middle West, entitled *Service Station Starts in Kalamazoo*, 1957-58.

In spite of its unpromising title, the study appears to do a good job in investigating the problems which confronted the men who started gasoline service station businesses in Kalamazoo County, Michigan, over a period of two years.

Such problems are not by any means entirely restricted to the district under study. Most of them are common to any country in which such businesses are privately-operated, and should therefore be of considerable interest to anyone engaged in petroleum marketing.

The book contains the questionnaire used in the interviewing of the station owners and the results thereby obtained are reviewed under such headings as the background and training of owners; their reasons for starting their own businesses; how they began, and the types of financial assistance obtained; how much advance planning was done on investigation of area potential and financial history, inventories, and equipment of the business; and whether they had achieved success or not and the reasons for this.

Single copies of the booklet may be obtained free of charge from The W. E. Upjohn Institute for Employment Research, 709 South Westnedge Avenue, Kalamazoo, Michigan.

Castrol Motoring Films

Three new Castrol 16-mm colour films, recently previewed in London, are now available for free loan to motor, motorcycle, and scooter clubs.

As the roads of Europe get increasingly heavily populated, and thus more difficult for successful rally driving, so will the eyes of enthusiasts search for the "wide open spaces" of other continents, where long distance driving at speed over difficult country is still possible. *Coronation Safari* is the beautifully-photographed account of the 1959 East African Coronation Safari (the seventh since 1953) which will probably, for that reason, attain major stature in the international rally calendar before many years are past.

Covering 3000 miles of some of the toughest motoring country in the world, where breakneck speeds are still possible, the rally is graphically shown in the film as a constant battle against climate and terrain. At one stretch there is encountered a morass of "roads" in which the car often travels sideways, at another one drives in a dust cloud over tracks containing gullies 2 feet deep, or over sudden drops and ridges which can, and do, crack the chassis of the car.

Coronation Safari runs for 27 minutes, was produced by Stanley Schofield, and has a spoken commentary by Peter Garnier and Nevil Lloyd.

A second film, *Grand Prix de France*, tells the story of the first motorcycle races to be held on the new 5-mile Circuit de Montagne d'Auvergne; near Clermont Ferrand. These were for the 1959 French Grand Prix, the first motorcycle world championship of the year, and consisted of three races: for 350 cc and 500 cc machines, and for sidecars.

The film, which runs for 28 minutes, was produced by Kinocraft. Harry Louis wrote the commentary, which is given by Raymond Baxter.

The third Castrol work is their first all-scooter film, *Scooter Sport*, showing this increasingly popular mode of travel in three widely varying types of competition.

First is the Highland Scoot, a road event over some of the beautiful scenery of Western Scotland. This is followed in great contrast by scenes from the Scottish Six Days' Trial for motorcycles, which although covering some extremely difficult and punishing country, included the entry of three Lambrettas. These were received with a good deal of head shaking and disbelief from the experts, but eventually emerged extremely creditably from their ordeal.

Lastly, the carnival atmosphere and gymkhana-type competitions of the Lambretta Owners Association's Woburn Rally are seen in a rather light-hearted contrast. Franklin Engelmann is the commentator of *Scooter Sport*, which was produced by C. H. Wood of Bradford, and lasts for 18 minutes.

The London-Birmingham Motorway

The new Laing film *Motorway*, which is a sequel to an earlier Company production: *Major Road Ahead*, is a 30-minute record in colour of the building of 55 miles of Britain's first full-length motorway across five counties, in the remarkable time of only 19 months.

The film ranges along the route of the motorway, which extends from the north end of the new St Albans By-pass near Luton, to connexions with the Birmingham and Holyhead roads at Dunchurch and Crick, near Rugby. Many facets of the story of how this vast co-ordinated enterprise has been accomplished in record time by a highly-mechanized labour force, are clearly shown: the painstaking and lengthy preliminary work; the organization of supplies; and the fight against the disastrous summer and winter of 1958, the one providing almost incessant rain and the resultant flooding of building sites and the other heavy snow, ice, and fog. The months of good weather that followed in the spring of 1959 were a time-saving sequel after the previous delays.

In only 19 months 11½ million cu yd of earth had been excavated and 134 bridges built to carry the motorway across roads, rivers, canals and railways; seven special road junctions had been constructed to provide access at intermediate points; construction work had involved the supply of 3½ million cu yd of material—delivered at a peak rate of over 30,000 cu yd a day.

Never before in the history of civil engineering in the U.K. had so great a concentration of plant and machinery been assembled on a single project. Mechanical plant valued at over £5 million and aggregating some 80,000 hp was employed at peak periods.

The film pays deserved tribute to all those who, by their co-operation and efforts, have brought M.1 into being—"a blueprint for the future". In 16-mm "Kodachrome", and accompanied by a commentary spoken by Richard Baker, copies of the film may be obtained free on loan from John Laing and Son Ltd, Public Relations Department, 4 Regent Street, London, S.W.1.

Lectures, Courses, and Conferences

Instruments, Electronics, and Automation

The International Instruments, Electronics, and Automation Exhibition at Olympia, London, in May 1960 will be double the size of the last Exhibition, held in 1958. A dozen foreign countries will be represented.

Trade associations promoting the exhibition are:—The British Electrical and Allied Manufacturers' Association; the British Industrial Measuring and Control Apparatus Manufacturers' Association; the British Lampblown Scientific Glassware Manufacturers' Association; the Electronic Engineering Association; and the Scientific Instrument Manufacturers' Association of Great Britain.

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"OIL AND PETROLEUM YEAR BOOK"

The fiftieth edition of Walter E. Skinner's *Oil and Petroleum Year Book*, for 1959, is now available. Its eight hundred pages are full of information on the international structure of the petroleum industry. Complete and up-to-date particulars of over one thousand of the world's principal oil companies are provided, with reliable details concerning directors, operations, capital structure, etc.

In addition, an international buyers' guide section lists suppliers of equipment under some 2000 headings. Names and addresses of over 700 managers, engineers, etc, and their companies are given, whilst maps include those of the oilfields of the Middle East and of the Trans-Canada natural gas pipeline system.

Copies are obtainable from Walter E. Skinner, 20 Copthall Avenue, London, E.C.2, price 40*s* (42*s* 6*d* post free).

Middle East Oil Production

	September	*Jan.-September*
	tons	*tons*
Iraq Petroleum Co. Ltd ...	2,414,217	19,741,242
Basrah Petroleum Co. Ltd. ...	1,099,063	9,222,195
Mosul Petroleum Co. Ltd ...	103,912	952,120
Qatar Petroleum Co. Ltd ...	690,555	5,990,084
Iraanse Aardolie Exploratie en Productie Mij	4,006,000	33,035,000
Kuwait Oil Co. Ltd	5,278,287	51,483,248
	Barrels	*Barrels*
Arabian American Oil Co. (Saudi Arabia)	31,674,710	292,959,157
Bahrain Petroleum Co. Ltd ...	1,355,183	12,326,882

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij, for September was 1,279,000 tons, the total for 1 January to 30 September being 11,383,000 tons.

Crude processed at Aramco's Ras Tanura refinery during September amounted to 5,245,099 brl, the total for 1 January to 30 September being 47,475,181 brl.

Oil deliveries from Sidon, Lebanon, by Trans-Arabian Pipe Line Co. in September were 9,492,375 brl, the total for 1 January to 30 September being 94,202,259 brl.

Trade Literature

U.S. Purchase of Oil Equipment Company

The new British company, U.S. Industries Inc (Great Britain) Ltd, whose formation was recently announced, has purchased the Burtonwood Engineering Company Ltd, of Burtonwood, Lancashire.

The Burtonwood company are mainly concerned with production of oilwell equipment, oil seals, machinery for the plastics industry, and engine reconditioning. Their main factory is at Burtonwood, whilst further workshops are situated at Welwyn Garden City and Wigan. A servicing branch is operating in Venezuela.

The offices of U.S. Industries Inc (Great Britain) Ltd are at New Bond Street House, 1-5 New Bond Street, London, W.1.

Clark Bros. U.K. Manufacturing

Since 1950, engines and compressors to the design of Clark Bros Co. of Olean, U.S.A. have been manufactured in the U.K. under licence by Alley & MacLellan (Polmadie) Ltd.

This agreement has now been terminated and manufacture is now to be undertaken in U.K. under licence by G. & K. Weir Ltd, Engineers, Cathcart, Glasgow. As previously, sales and service will be undertaken by Clark Bros, and all enquiries should be addressed to them at 197 Knightsbridge, London, S.W.7.

New Thames Oil Depot

Petrofina (Gt. Britain) Ltd have awarded the contract for the construction of their new distribution depot on the River Thames at Fulham, to William Press & Son Ltd.

The contract includes the provision of a large multi-compartment underground storage tank for motor spirit, and three 500-ton vertical storage tanks for other products; these are being built by Whessoe Ltd, of Darlington. The various pumps are being supplied by Stothart & Pitt Ltd, Worthington Simpson Ltd, and Rhodes, Brydon & Youatt Ltd.

The depot will be supplied initially by dumb barges from the Company's main storage at the mouth of the Thames and is scheduled for operation before June 1960.

Contact Welding Electrode

Philips Electrical Ltd are now marketing a new zircon iron powder-coated electrode, specially developed for rapid, trouble-free contact welding of all mild and low alloy steels in downhand, standing fillet, and horizontal-vertical positions.

A leaflet giving full technical and test data and chemical analysis is obtainable from Philips Electrical (Industrial Products Division), Century House, Shaftesbury Avenue, London, W.C.2.

Simmonds Aerocessories' Stockholm Office

New offices at Älvajö, on the outskirts of Stockholm, have been opened by Simmonds Aerocessories AB, a member of the Firth Cleveland Group. Full advantage is to be taken by Simmonds Aerocessories for the development of trade in anticipation of the new customs union of the Outer Seven Countries. C. Edgren is the managing director of the Swedish Company.

Copper and Brass Sheet and Strip

The Metals Division of ICI Ltd have just published a new booklet entitled *ICI Sheet and Strip—Copper and Copper Alloys*. This is the first time that a comprehensive publication covering all the Group's main copper and brass sheet and strip production has been issued.

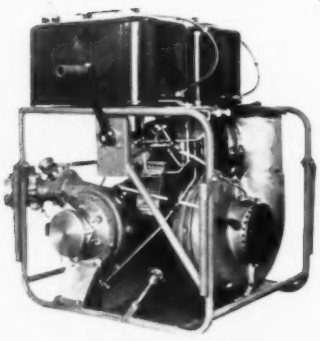
The booklet describes the production, properties, and applications of the products, and gives technical data on size ranges, characteristics, properties, etc., of each metal, with tables of their various weights at varying sizes.

New Megger Insulation & Continuity Tester

Evershed & Vignoles Ltd, Acton Lane Works, Chiswick, London, W.4, has introduced a new *Megger* insulation and continuity tester, the Series 3.

The instrument is calibrated with international markings and embodies a hand generator which requires much less turning effort than previous models. The tester can also be provided with a second range (0-100 ohms) for continuity testing which is brought into operation by a changeover switch.

New Baby Gas Turbine



A new British-built "baby" gas turbine that can do giant jobs is the 98-lb Perkins Mars gas turbine, shown in the accompanying photograph, which will run equally well on diesel fuel, kerosine, or low-grade petrol, can be lifted easily, and yet develops 50 hp at 40,000 rev/min. It has only three major components and few moving parts.

It can be used for a wide variety of applications including pumping of liquids and fuels, ships' salvage operations, ship-board de-icing, smoke screen generation, air compressors, generation of electricity, and for instructional purposes. Further details should be obtained from Perkins Gas Turbines Ltd, Peterborough.

Insulation at Whitegate Oil Refinery

M. A. Boylan Ltd, the Irish firm of insulation contractors, were responsible for the insulation contract at the new oil refinery at Whitegate, Co. Cork. This was the largest insulation contract ever carried out in the Irish Republic.

The piping was insulated with *Caposite* amosite asbestos sections, finished with an asbestos-based felt. The towers, chimney stacks, and vessels were insulated with *Rocksil* mattresses and slabs, and finished with aluminium sheeting. The Cape Asbestos Co. Ltd, of whom M. A. Boylan Ltd are a subsidiary, supplied all the insulation materials.

Lubricants for World's Biggest Nuclear Power Station

At Trawsfynydd, Merionethshire, North Wales, construction has just commenced on the world's biggest nuclear power station, which will have an input to the U.K. electricity grid of 550 mW.

Esso Petroleum Company Ltd has been awarded the supply of all lubricants for this new power station. This award follows a research programme in the Esso Research Centre at Abingdon, Berkshire, culminating in the successful development of new radiation-resistant oils and greases which are necessary for the safe operation of equipment in the nuclear reactor. These new oils will be marketed under *Essotron* and the greases under the name *Cosmos*.

New UOP Hydrodealkylation Process

Universal Oil Products Company has announced the availability for licensing of a new catalytic hydrodealkylation process, tradenamed Hydeal. The new process resulted from the research, development, and engineering efforts of both Ashland Oil and Refining Company and UOP. The Hydeal process initially may be installed for the production of benzene from low value heavier aromatics.

By use of Hydeal, refiners, chemical manufacturers, and coke oven operators can produce, for chemical use, benzene from such feed stocks as toluene, xylenes, and heavier aromatic mixtures. The process may also be applied for the manufacture of phenol and naphthalene from higher boiling substituted phenols and alkylnaphthalenes. Universal will handle licensing details for the new process.

New Type Acrylonitrile Plant

Construction of the Sohio Chemical Company's new acrylonitrile plant at Lima, Ohio, is now nearly half completed and is on schedule. Ground breaking took place early in April, and first product test runs are now expected in early 1960.

The plant will employ a process unique in acrylonitrile manufacture: single-step direct conversion of refinery propylene and anhydrous ammonia. The process was discovered at the Sohio Research Centre and later refined and adapted for commercial application by Sohio and Badger Manufacturing Co. Sohio is progressing with plans to commercialize the process outside the U.S.A. through licences and other contractual arrangements.

World's First Butamer Unit

The first commercial Butamer unit for conversion of normal butane to *iso*butane, designed and licensed by Universal Oil Products Company, has gone on stream at Standard Oil Company of California's Richmond refinery.

The Butamer unit is integrated with a new alkylation plant, saving in construction and operation costs. Both units share the same de-*iso*butanizer column. High concentrations of *iso*butane in the effluent from the Butamer process, about 60 per cent for each pass of normal butane, are attributed to a new UOP platinum-containing catalyst, which operates at a high space velocity with temperatures well below 500 F. The product is a motor fuel blending component. The unit is capable of handling 5900 bsd of reactor feedstock and producing 3200 bsd of net *iso*butane product. It takes its normal butane charge from the refinery's new cat cracker, via the alkylation unit fractionation system, plus *n*-butane from other sources.

The unit went on stream less than a year and a half after formal announcement of the Butamer process by UOP.

New Flame-Proof Electronic Gauge

A new model of the Gilbarco electronic tank gauge for use on deep storage tanks, is shortly to be available from Firth Cleveland Instruments Ltd, Stornoway House, Cleveland Row, London, S.W.1. The new model, CMB 107U, is housed in a ductile iron case and meets American Class I Group D. Division I requirements for flame proofness. Official approval of this model by the Gilbert & Barker Manufacturing Co, U.S.A., has been granted by the Underwriters Laboratory of Chicago, Illinois.

Firth Cleveland have for some time manufactured under licence the standard Gilbarco tank gauge in aluminium cases for use where full Underwriters' Certification is not called for. The new model retains all the features of the old, including accuracy in the field to $\frac{1}{16}$ inch, and in the laboratory to $\frac{1}{64}$ inch.

Laboratory Chemicals Price Catalogue

Griffin & George Ltd, Ealing Road, Alperton, Wembley, Middlesex, laboratory furnishers, have now completed distribution of their current comprehensive price list of laboratory chemicals.

The catalogue comprises 84 pages of general chemicals, AnalaR, and micro-analytical (MAR) reagents, and many pages devoted to microscopical stains, reagents for water analysis, and other specialized items.

SIE Seismic Data Processing System

SIE (Southwestern Industrial Electronics Co.), 10201 Westheimer Road, P.O. Box 13058, Houston 19, Texas, a Division of Dresser Industries Inc, announces the sale of their $67,000 MS-18 GeoData seismic data processing system to Asiatic Petroleum Co. for service with Compania Shell de Venezuela.

The SIE MS-18 GeoData system is used for presenting cross-sections of the earth's sub-surface from the combined analysis of a series of seismic records. The magnetic recordings from which the analysis is to be made are placed on the drum of the MS-18 and monitored with appropriate corrections automatically inserted, to present a corrected cross-section sub-surface presentation. Several types of visual presentation are available, and the MS-18 is particularly useful where seismic data are difficult to interpret.

Evershed & Vignoles Canadian Expansion

Evershed & Vignoles Ltd, Acton Lane Works, Chiswick, London, W.4, have announced the reorganization and enlargement of their Canadian activities by the formation of a new Company which is to be known as Evershed-Powertronic Ltd. The Company will operate from Toronto and will provide a complete, coast-to-coast specialist sales and service organization for the installation of automatic electronic control equipment.

Head Wrightson Equipment

Engineering for World Industry is the title of a booklet which portrays in illustrated form some of the wide range of equipment produced by the Head Wrightson Companies throughout the world. The equipment featured ranges from petroleum and chemical plant and equipment, and nuclear research and power plant, to rolling stock, and iron and steel castings and forgings.

Plastic Transmission Belting

A new catalogue for Dixylon Plastic Transmission belting, the precision belting for high-speed drives, has been published by R. & J. Dick Ltd, Greenhead Works, Glasgow, S.E.

The catalogue, which describes in detail the belts that will operate at velocities of 10,000 ft/min, gives additional information on bolt thicknesses, coefficients of friction, horse power rating per width of belt, etc. A development of the new plastic belting is Dixylon Suplex, an oil-resisting belt which retains its coefficient of friction even when operating where large quantities of running oil are present.

Oilwell Pumps

The latest edition of the *Inco-Mond Magazine* of The Mond Nickel Co. Ltd includes an article on oilwell pumps. It describes the requirements for such pumps and gives an account of the range manufactured by Le Grand Rochester Ltd.

Other articles include those on the pumping of chemical fluids, and temperature measurement by platinum rhodium thermocouples.

Steel Lubricated Plug Valves

One of the latest additions to the wide range of products manufactured by Triangle Valve Co. Ltd, 315 Regent Street, London, W.1, is the lubricated plug valve 1872W, flanged to ASA 150 series.

Body, cover, gland, and stop are in cast carbon steel to BS 1504–161, Grade B: cast iron (high duty) plug to BS 1452 Grade 14 (ASTM A216 Grade WCB) steel lantern ring; rubberized cotton fabric packing; asbestos fibre gasket; diaphragm in stainless steel. Grease slugs are interchangeable with other leading makes.

Prefabricated Industrial Buildings

A new leaflet has been issued by Coseley Buildings Ltd, Lanesfield, Wolverhampton, which indicates the versatility of the Company's range of prefabricated industrial buildings. A more comprehensive brochure is also available.

Audco Valve Equipment

Audley Engineering Co. Ltd, Newport, Shropshire, have issued two new leaflets, one giving details of a new type of Audco valve with PTFE sleeve plug, and the other dealing with application of the Audco Combination Lubricator—a combined grease nipple and lubricant screw for Audco valves.

De Havilland Propellers forms System Engineering Group

De Havilland Propellers Ltd has formed a new group to apply its experience in system engineering to the development of equipment for the automatic control of industrial processes and manufacture of all kinds.

The Group, which will be located at Hatfield, Herts, will place particular emphasis on the design of integrated systems, and here the comparatively new techniques of system engineering will be used, backed by digital computer investigations where necessary, to produce the optimum design at any level of complexity.

Iraq Pipelines Contract

Turriff-Burden Ltd, an association of the Turriff Construction Corporation, of London, and the Burden Construction Company, of Tulsa, Oklahoma, have been awarded a contract by the Iraq Petroleum Company for the immediate construction of 314 miles of 30-inch and 32-inch pipeline in Iraq.

The IPC and associated companies are investing some £15 million in this project, which will aid in the expansion of annual production to 57 million tons by 1962.

Forthcoming Meetings

THE INSTITUTE
(At 61 New Cavendish Street, London, W.1, 2.30 p.m.—tea 5 p.m.)
Flow Properties of Admiralty Fuel Oils. A Symposium. 6 January

IP ESSEX BRANCH
(At Coryton Technical Institute, 7.30 p.m.)
Annual General Meeting. Film Evening **20 January**

IP FAWLEY BRANCH
(At Esso (Fawley) Recreation Club, Holbury, 7.30 p.m.)
Annual General Meeting. Film Show **13 January**

IP LONDON BRANCH
(At Chatham Rooms Restaurant)
Social Evening. **21 January**

IP NORTHERN BRANCH
(At Engineer's Club, Albert Square, Manchester 2, 6.30 p.m.)
Industrial Uses of Radioactive Isotopes. J. F. Cameron. **19 January**

IP SCOTTISH BRANCH
(At BP Refinery Recreation Hall, Grangemouth)
Annual General Meeting (7.0 *p.m.*). **Plastics from Petroleum** (7.30 *p.m.*). B.H.C. Staff. **21 January**

IP SOUTH-EASTERN BRANCH
(At King's Head Hotel, Rochester, 7.45 p.m.)
Annual General Meeting. My Visit to Middle East Oilfields. J. H. Evans. **5 January**

IP SOUTH WALES BRANCH
(At the Training Centre, BP Refinery (Llandarcy) Ltd, 5.30 p.m.)
The Role of the Petroleum Industry in the Development of Car Markets. K. E. W. Ridler, Ph.D. **7 January**

IP STANLOW BRANCH
(At the Lecture Room, Grosvenor Museum, Chester)
Annual General Meeting (7.0 *p.m.*). **Film Show** (7.30 *p.m.*). **20 January**

IP YORKSHIRE BRANCH
(At Hotel Metropole, Leeds, 7.0 p.m.)
Annual General Meeting. Molybdenum Disulphide as a Lubricant. G. J. C. Vineall. **13 January**

IP ECONOMICS & OPERATIONS GROUP
(At 61 New Cavendish Street, London, W.1, 5.30 p.m.—tea 5.0 p.m.)
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Author Index

DIXON, E. J., Forecasting Demand in Industries Associated with Road Transport, 205

FRANKEL, P. H., 1958 and its Implications for the Oil Industry, 173

HERBERT, E. LEQ., Technical Education and the Needs of the Petroleum Industry, 337

HUTCHISON, T. B., Supertanker Construction, 317

JUKES, J. A., The Development of Nuclear Power, 190

KELLY, C. I., Transporting Liquefied Methane, 106

LONGRIGG, BRIGADIER S., Developments in the Middle East, 63

LUTTRELL, J. F., Oil and the Community, 238

SAPOUNOV, O. K., Soviet Earth Satellites, 141

VIGNOLES, C. M., The Place of Oil as a Source of Fuel and Power for Britain, 83

WOODBRIDGE, ERIC, The United Kingdom Motor Vehicle Industry, 1, 37

Subject Index

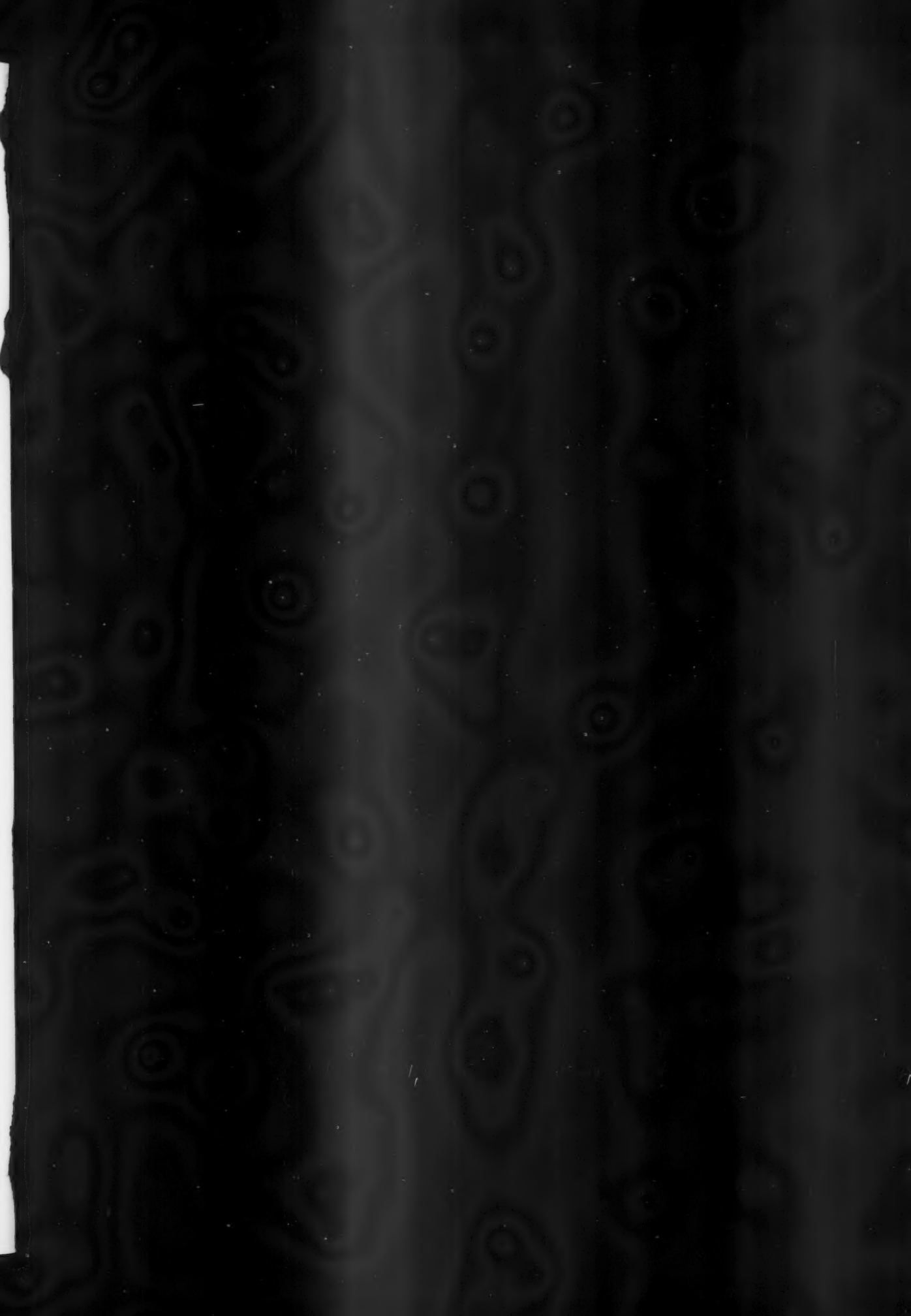
Abu Dhabi exploration, 17
Additive, diesel fuel, 312
Angola, exploration, 151
API viscosity standards, 52
ASTM:
  Aromatics Standards Subcommittee, 297
  discussions on nuclear technology and hydraulic fluids, 153
Atomic energy, 187, 190, 226
Australia:
  drilling subsidies, 289
  exploration review, 147, 289
  oil investments, 327
  petroleum statistics, 112, 302
  service station plan, 354
Austria, exploration, 151
Aviation:
  fuelling jet aircraft, 219, 384
  lubricants for supersonic flight, 189
Bahrain oil operations, 299
Books:
  Abbreviations of associations, 170
  Advances in Petroleum Chemistry and Refining, 250
  Adventure in Oil, 229
  Alberta Research Council Report, 230
  American Petroleum Refining, 311
  Analyses of Alaskan crude oils, 229
  Basic Electricity—Basic Electronics, 128
  Basic Statistics of Energy for OEEC Countries, 197
  Bibliography of gas-producing processes, 197
  British Hydrocarbon Chemicals Ltd 1958, 92
  British Petroleum Equipment, 361
  BP Fifty Years in Pictures, 229
  BP News in Pictures, 127
  British Standards, 23, 93, 129, 197, 251, 387
  BSI Report and *Yearbook*, 361
  Canada, Guide for Oil and Gas Operators in, 169
  Catalyst, 251
  Competitive Aspects of Oil Operations, 11
  Cutting Fluids, 361
  DECHEMA publications, 93, 128, 170, 332
  Directory of Opportunities for Qualified Men 1959, 24
  Eléments Statistiques, 198
  Engineering Materials and Design, 22
  ENI Report, 169
  Esso Annual Review 1958, 196
  European gasoline engine development, 169
  Far East Oil Symposium, 349
  Fawley Foundation Lecture, 127
  Fuel Combustion Calculations, 170
  Fuel Research 1957, 21
  Gas Council Report, 382
  Gasification methods bibliography, 229
  Handbook of the Petroleum Industry, 169
  Industrial Solvents and Flammable Liquids, 311
  Journal of Research (NBS), 311
  Lapis, 22
  Lighting in Corrosive, Flammable, and Explosive Situations, 23
  Lubricating Oils for Industrial & Heavy Duty Automotive Engines, 361
  MERL Research Summaries, 129
  Methane in coalfields, 251
  Monitor, 311
  National Bureau of Standards, 229
  Notes for Authors, 250
  OCMA Specifications, 198
  OEEC 1958 oil statistics, 311
  Oil and Petroleum Year Book, 388
Books (*cont.*)
  Oil Fires, 332
  Oil is Where they Find It, 361
  Oil Man, 310
  Oil-Shale Mine, Rifle, 93
  Our National Heritage, 197
  PIB wall map, 386
  Phase Relations of Gas Condensate Fluids, etc, 250
  Philatelic Story of Oil, 310
  Pipeline Handbook, 182
  Policies for Sound Economic Growth (OEEC), 196
  Polymer, 361
  Pumping, 230
  Radioactive Markers in Go-devils, 198
  Russian journals, 230, 251, 311
  Service Station Starts in Kalamazoo, 1957-58, 387
  Statistical Digest, 308
  Statistical Summary of the Mineral Industry, 170
  Supply and Distribution of Chemical Engineers in G.B., 23
  Synthesis gas purification, 310
  Tanker Freight Statistics, 170
  Tanker Safety Code, 11
  Technical Dictionaries Catalogue, 128
  T2 Tanker in 1959, 362
  USBM survey of motor gasolines, 128
  World petroleum prices and taxes, 127
  World Survey of Motor Gasoline Quality, 229
British Honduras, exploration, 326
British Oil Burners Manufacturers Association, 244
British Petroleum Co. Ltd:
  BP Research Centre reorganization, 44
  BP-Sinclair companies formed, 148
  Golden Jubilee, 135
  Government holdings in, 105
  Italian marketing, 201
  Malta activities, 360
  operations in 1958, 214
  petroleum chemicals, 122
  purchases in 1958, 118
  tankers, 88, 90, 302
British Somaliland, drilling, 352
Burmah Oil Co. in U.S.A., 298

Caltex Pernis laboratories, 365
Cameron Iron Works, 8, 280
Canada:
  oil and gas reserves, 199
  oil concessions, 300
  oil potential, 4
Carless, Capel & Leonard centenary, 385
Catalyst aging units, 119
CBMPE:
  annual dinner, 355
  British Oil Equipment Credits Ltd, 188
  Pemex contract, 188, 217
  report, 219, 305
Chemical engineering research, 202
Chemical manufacturers, European, 245
Coal-oil conversion, 312
Conference on Liquid-Fuel Firing, 210
Corrosion engineers association, 305
Coxon, G. H., 209

Distillation, lectures on, 152
Dracone, the flexible oil barge, 112, 302, 380
DSIR Report for 1957, 21
Duties:
  heavy oils, 256
  receipts from hydrocarbon oils, 309

Egypt:
  return of Shell and BP, 148, 298
  Shell operating agreement with Government, 44
Equipment, petroleum:
  exports from U.K., 88
  oil well control, manufacture in U.K., 8
  orders by oil companies, 15, 120, 329, 342
Esso Research and Engineering Co. laboratories, 282
Esso Research Ltd laboratories, 31
Esso's Fawley petrochemicals plant, 49
Fao-Amaya jetty, 307
Films:
  Antarctic Crossing, 24
  Beauty in Trust, 93
  Borgo a Mozzano, 170
  Compressor Lubrication, 230
  Coronation Safari, 387
  Grand Prix d'Europe 1958, 24
  Grand Prix de France, 387
  Kellogg sponge iron process, 198
  Lubricants with Care, 230
  Motorway, 387
  Motorway Manners, 369
  Muscles of Control, 198
  On the Limit, 24
  PFB catalogue, 198
  Scooter Sport, 387
  Song of the Clouds, 306
  Trial and Error, 24
  Two Wheel Trio, 24
Fleck Committee on coal conversion, 140
Florida, offshore drilling, 379
France, petrochemicals, 150
Fuel cell, development with petroleum, 358
Gas from oil, 105, 312, 382
Gas producing processes, bibliography of, 197
Gas purification process, USBM, 245
Gas storage, underground, 277
Gas turbine, ship conversion to, 187
Germany, West:
  crude production, 88
  natural gas production, 117
  refinery output, 88
Guatemala, drilling in, 87
Gulf Oil Corp operations, 244
HD oils, Ministry of Supply approval of, 21
Helium, 14, 119, 186, 300
Honours, British, 47, 241
Humble Oil & Refining Co, 274
Hungarian oil search, 116
Hydrogenation of oil, 382
India:
  drilling, 16, 45, 245
  Oil India (Private) Ltd, 119
  pipelines, 304
Indonesia, pipeline, 91
Institute of Petroleum:
  annual dinner, 97
  awards, 154, 340
  Birmingham students dinner, 162
  Branches:
    Bahrain, 121, 220, 223
    Essex, 78, 195, 377
    Fawley, 54, 165, 194, 378
    Kuwait, 76, 165
    London, 18, 56, 75, 164, 237, 349
    Northern, 20, 291, 377
    Scottish, 18, 54, 121, 165, 378
    South-Eastern, 18, 195
    South Wales, 78, 80, 237, 379
    Stanlow, 18, 54, 75, 121, 195, 196
    Trinidad, 236
    Yorkshire, 82, 223, 291
  Branches Committee chairman, 194
  Building Committee, 183
  council and officers, 180, 209
  council elections, 323
  Economics and Operations Group, 333
  president's badge of office, 52
  specification, 201
  Summer meeting papers 1958, 11

Institute of Petroleum (*cont.*)
Symposium on insulating oils, 48
Symposium on relaxation behaviour of oils, 26
Iran:
exploration, 91, 119, 184, 299
oil consumption, 354
operations in 1958, 216
Iraq:
oil discussions, 149, 184, 242
operations in 1958, 357
Jet fuelling, 301, 329
Khanaqin Oil Co, 243
Kuwait:
Minagish discovery, 219
oil operations, 90, 298
tanker, 189
twenty-one years of oil development, 102
Libya, exploration in, 16, 151, 242, 300, 343
Liquid fuel firing, progress in, 210
Liquid methane:
transporting, 106
U.K. imports, 105, 113, 182, 257, 382
London Lubricating Oil and Grease Association, 155
Louisiana oil operations, 276
LPG, distribution of, 213
Lubrication:
greases, tests for, 48
supersonic flight, in, 189
Mexico:
petroleum equipment, 217
refining, 304
Middle East:
developments, 63
economic aspirations, 138
oil and the community, 238
production, 5, 60, 71, 129, 168, 182, 225, 248, 306, 333, 339, 388
Milford Haven, tanker terminals, 14, 217
Mobil Oil Co. Ltd:
bulk terminal at Poole, 87
domestic heating loans scheme, 381
Ellesmere Port terminal, 115
Mobilgas economy runs, 17, 116, 354
Motor vehicles:
industry in U.K., 1, 37
petroleum and the automobile market, 20
Motorway, The, 369, 387
Multi-grade petrol pumps, 218
National Lubricating Oil and Grease Federation Dinner, 6
New Zealand exploration, 117
Nigeria:
drilling in, 45, 151, 184, 300, 352
pipeline, 189
refinery, 303
Nova Scotia, exploration, 380
Offshore drilling platforms, 104, 186, 278, 326
Oil Companies Materials Association, 11, 43
Oil from coal, 21, 312
Oil Industries Club Dinner, 4
Oil industry in 1958, 173
Oman, oil operations in, 312
Orient-Explorer, 104
Origin of petroleum, 12
Pakistan, drilling, 90, 119
Papua, drilling, 116, 185, 326
Petrofina SA, 242
Petroleum chemicals:
Dormagen plant progress, 115, 219
Fawley plant, 49, 303
Grangemouth plants, 92, 122
ICI plants, 372
Lake Charles, La., facilities, 87, 381
Montecatini plant at Ferrara, 354
Shell plants in Australia, 117
Union Carbide operations, 303
Pipeline Industries Guild, 127, 188, 333
Pipelines:
Aden, 189
Pipelines (*cont.*)
Haifa-Tel Aviv, 15
Irish Sea, 27
Nigerian, 189
Venice, 328
Plastics, 16, 81, 152
Pollution, air, 10, 21, 312
Pollution, sea, 10, 21, 87, 257
Power stations, oil in, 312
Public relations of oil, 238
Radiation, 304, 306
Record, world drilling speed, 16, 45
Refineries:
Baton Rouge, 284, 288
Botlek, 185
Clarkson, 380
Coryton, 15, 45
Dinslaken, 12, 150
Fawley, 49, 256
Grangemouth, 150
Haifa, 15, 87
Isle of Grain, 12, 118
Karlsruhe, 303
Kuwait, 303
Kwinana, 52
Lavera, 354
Llandarcy, 354
Mataripe, 304
Mersin, 185
Milford Haven, 370
Mombasa, 327
New Zealand, 217
Paulsboro, 185
Pernis (Shell), 185
Philippine (Shell), 91
Porto Maghera, 354
Richmond (Cal.), 119
Shell Haven, 114, 217, 303
Stanlow, 150, 151
Sudan, 352
Ville d'Anjou, 217
Whitegate, 186, 344
Research:
Caltex at Pernis, 365
DSIR in 1957, 21
Esso at Abingdon, 31
Humble at Houston, 275
Hungarian research unit, 16
Rocket fuels, 114
Socony Mobil at Paulsboro, 286
SONJ at Baton Rouge and Linden, 282
Wakefield (C. C.) at Hayes, 292
Royal Dutch Shell Group:
Bahamas organization, 188
exploration in Argentine, 46
organizational changes, 148
purchases of U.K. equipment, 244
U.S. activities, 152
Rubber tanks, collapsible, 305
Sahara, oil concessions, 300
Saudi Arabia:
gas injection, 184
LPG exports, 300
natural gas, sale, 304
oil operations, 299
Secondary recovery, 310
Senegal, exploration, 326
Shale oil, Colorado, 93
Socony Mobil Oil Co. operations, 243, 286
Spindletop, Texas, oilfield, 277
Sprake, C. H., 358
Standard Oil Co. (New Jersey):
forecasts for 1959, 118
merging of affiliates, 326, 379
ownership, 114
report for 1958, 115, 218
Stanlow pipelines, 188, 218
Sudan, exploration, 352
Synthetic rubber:
ISR (Hythe) plant, 329
polyisoprene rubber, 216
Tankers:
Aluco, 353
Auris, 353
Axina, 17
British Beacon, 188
British Destiny, 187
British Duchess, 89
British Fulmar, 187
British Judge, 88
British Kiwi, 327
British Lantern, 188
British Power, 217
British Queen, 327
British Signal, 380
British Splendour, 380
British Statesman, 16
British Trust, 302
construction of supertankers, 317
Esso Coventry, 90
Esso Dublin, 380
Esso Durham, 90
Esso Liverpool, 302
Esso Portsmouth, 90
Esso Tynemouth, 380
evolution, 1886-1961, 116
financing of U.K. tankers, 150
Kazima, 189
Mobil Acme, 380
overloading offences, 257
statistics of construction, launchings and registration, 70, 126, 224, 290
terminals, 14, 117, 244, 247, 307, 383
Universe Apollo, 149
W. Alten Jones, 187
World tanker fleet, 5, 371
Taxation, 48, 161, 256
Tetraethyl lead, U.K. exports, 88
Texas oil operations, 276
Thames Haven storage facilities, 252
Tranmere oil terminal, 383
Trinidad PD Report, 148
United Arab Republic:
plans for oil development, 13
United Kingdom:
exploration for oil and gas, 88, 149, 353, 382
government fuel and power policy, 105
marine geophysical survey, 380
motor vehicle industry, 1, 37
petroleum:
consumption, 56, 60, 105, 200, 248, 359, 384
demand in road transport, 205
imports and exports, 10, 72, 330
in the economy, 378
labour statistics, 103, 332
statistics for 1958, 308
United States of America:
carbon black production, 305
natural gas statistics for 1956-1957, 27
oil industry visited, 274
Universal Oil Products Co., 184
U.S.S.R.:
exports to U.K., 182
oil trade and tankers, 89
Venezuela:
embryonic oil deposit, 12
income tax increase, 44
Wakefield, C. C., & Co.:
half century of, 235, 251
new building, 329
Waterflood techniques, 310
Waterlogged wells, treatment of, 299
World oil:
demand, 156, 298, 323
production, 46, 92, 156, 323
reserves, 86, 199, 323
World Petroleum Congress, 53, 169, 179, 257, 261
World Petroleum Statistics, 156
World Power Conference, 348



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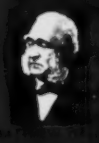

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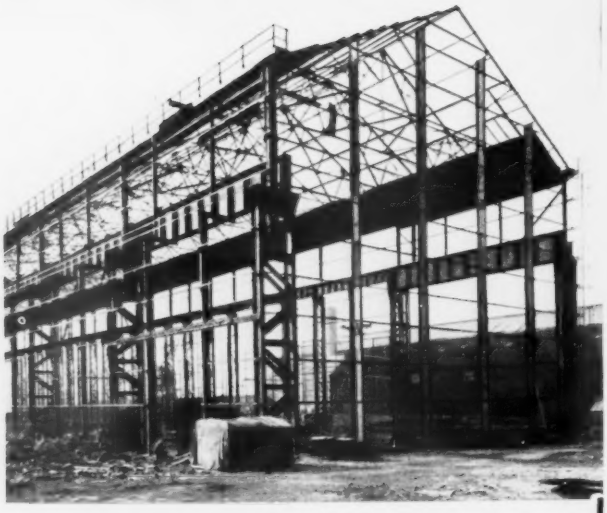

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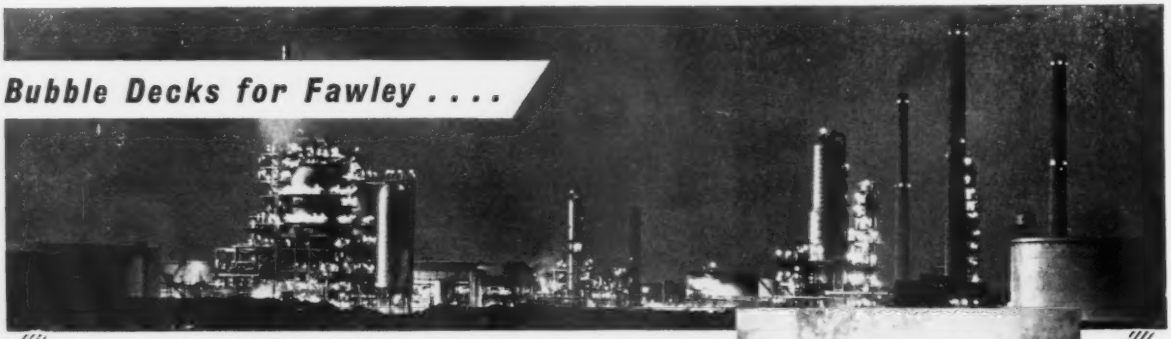

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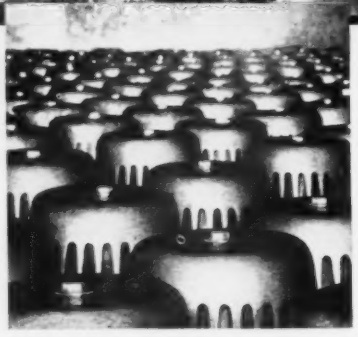

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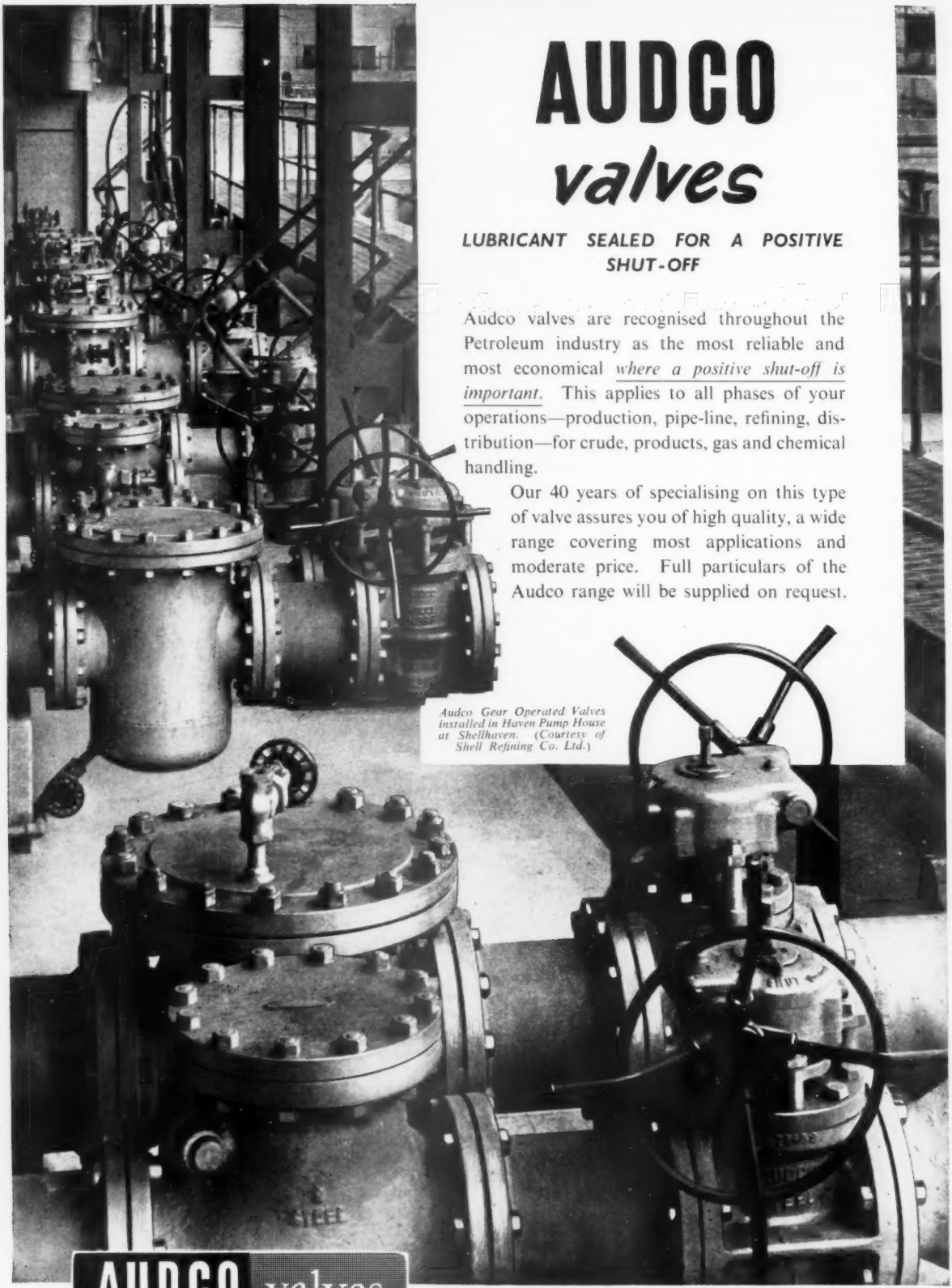

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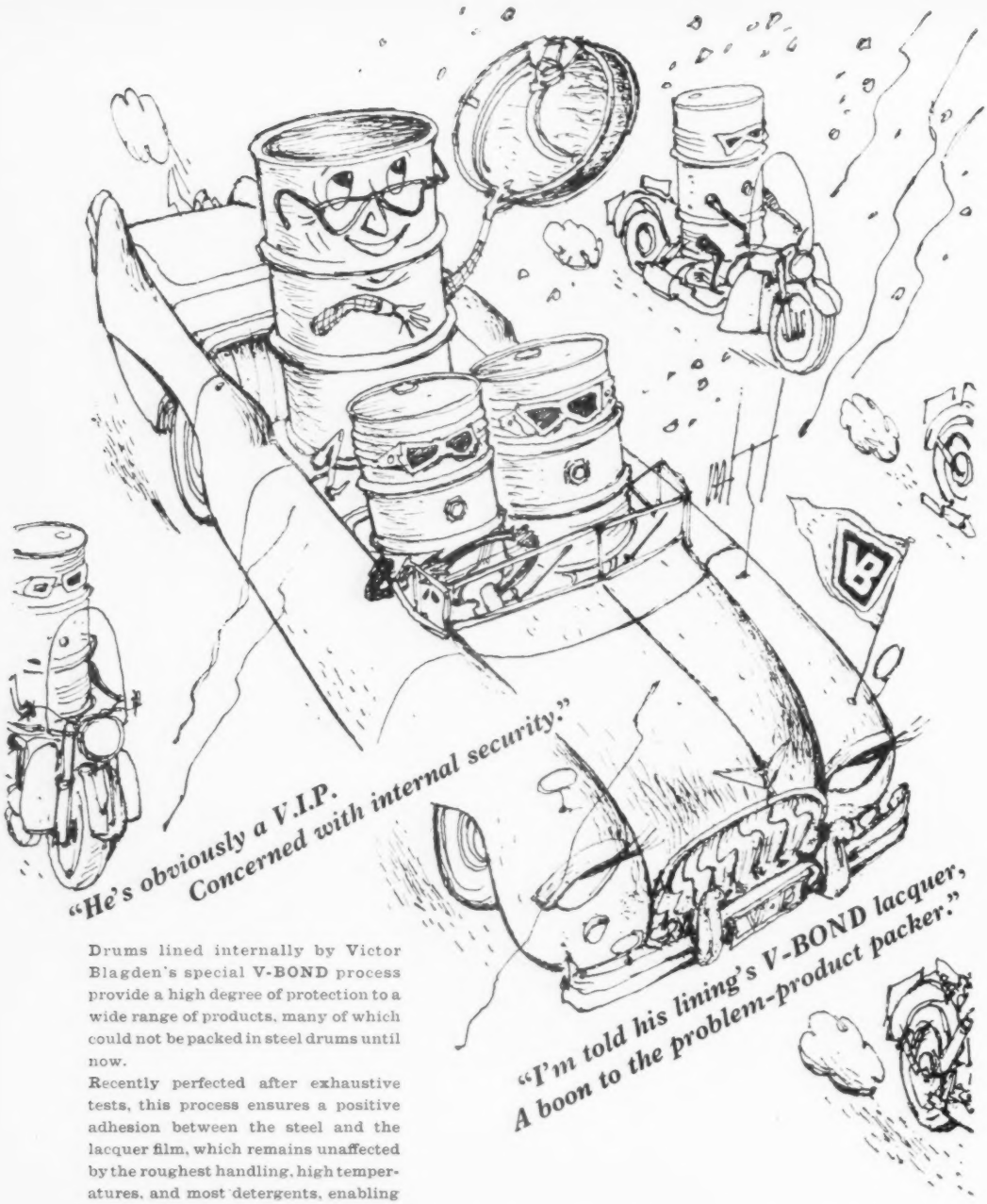
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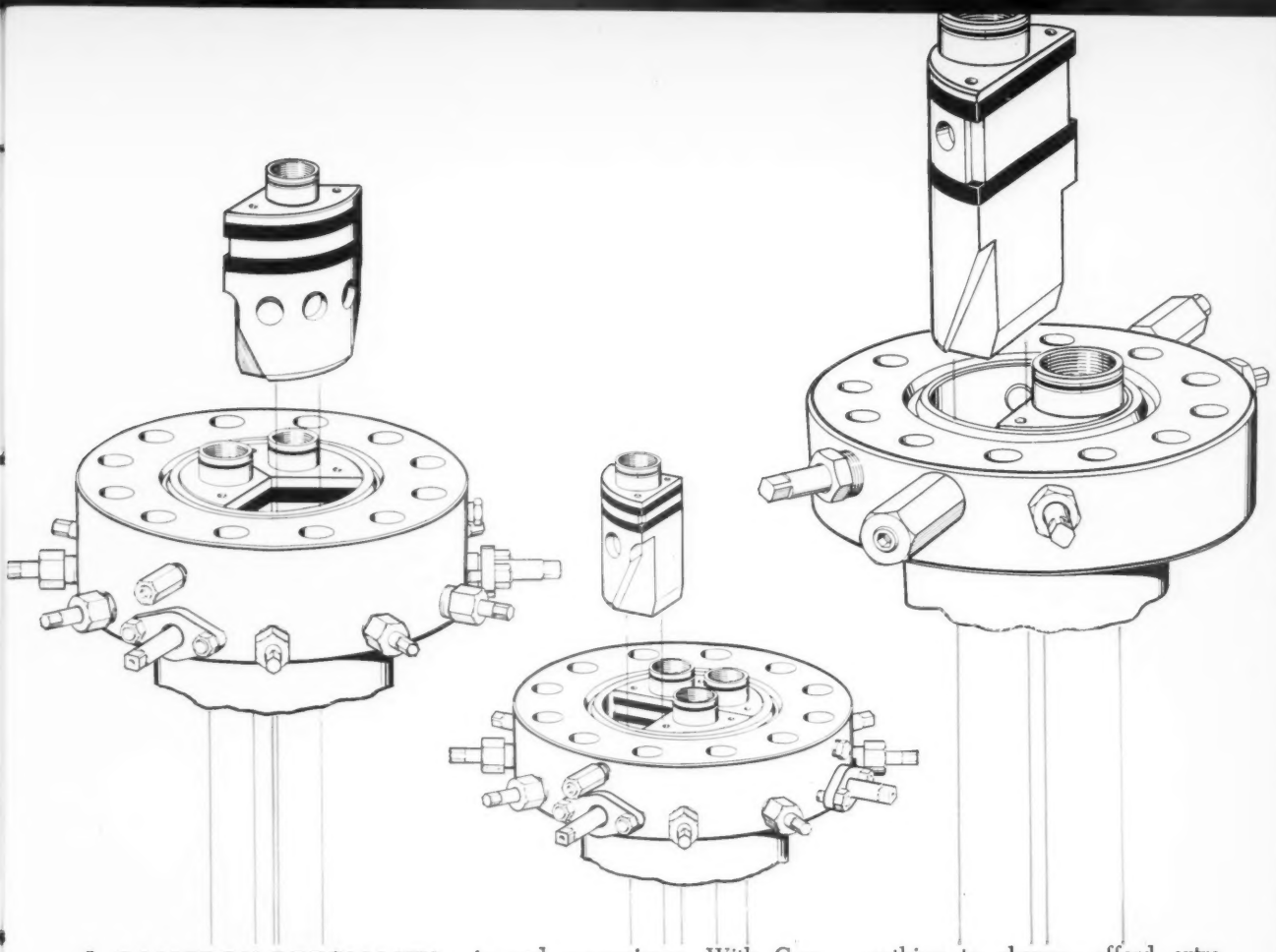

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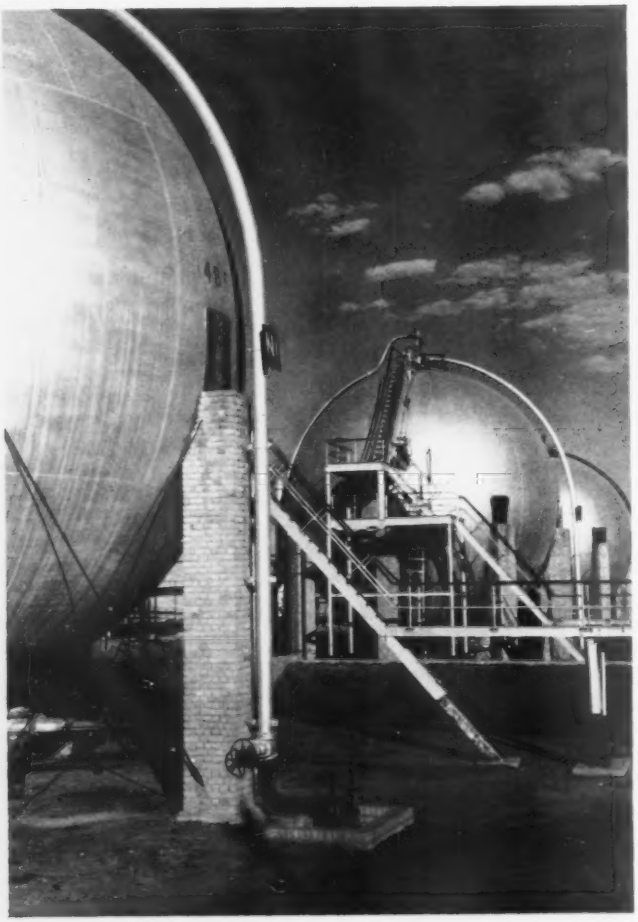

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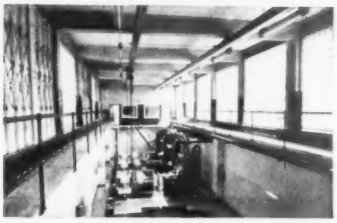

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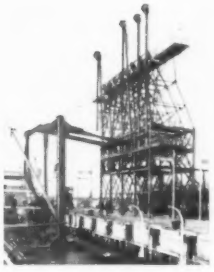

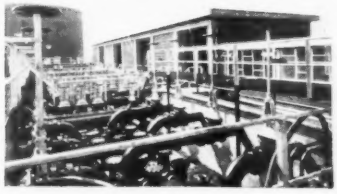

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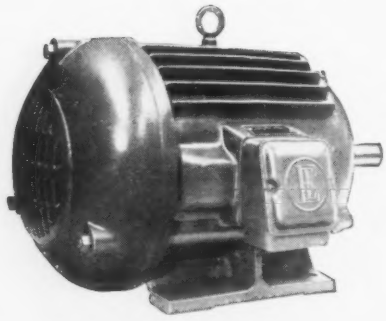

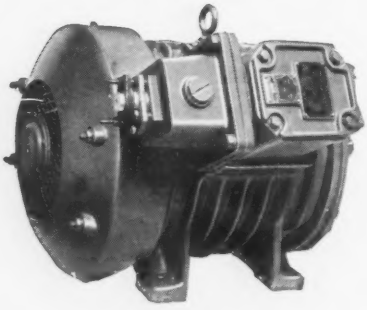

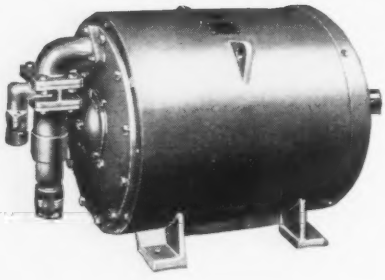

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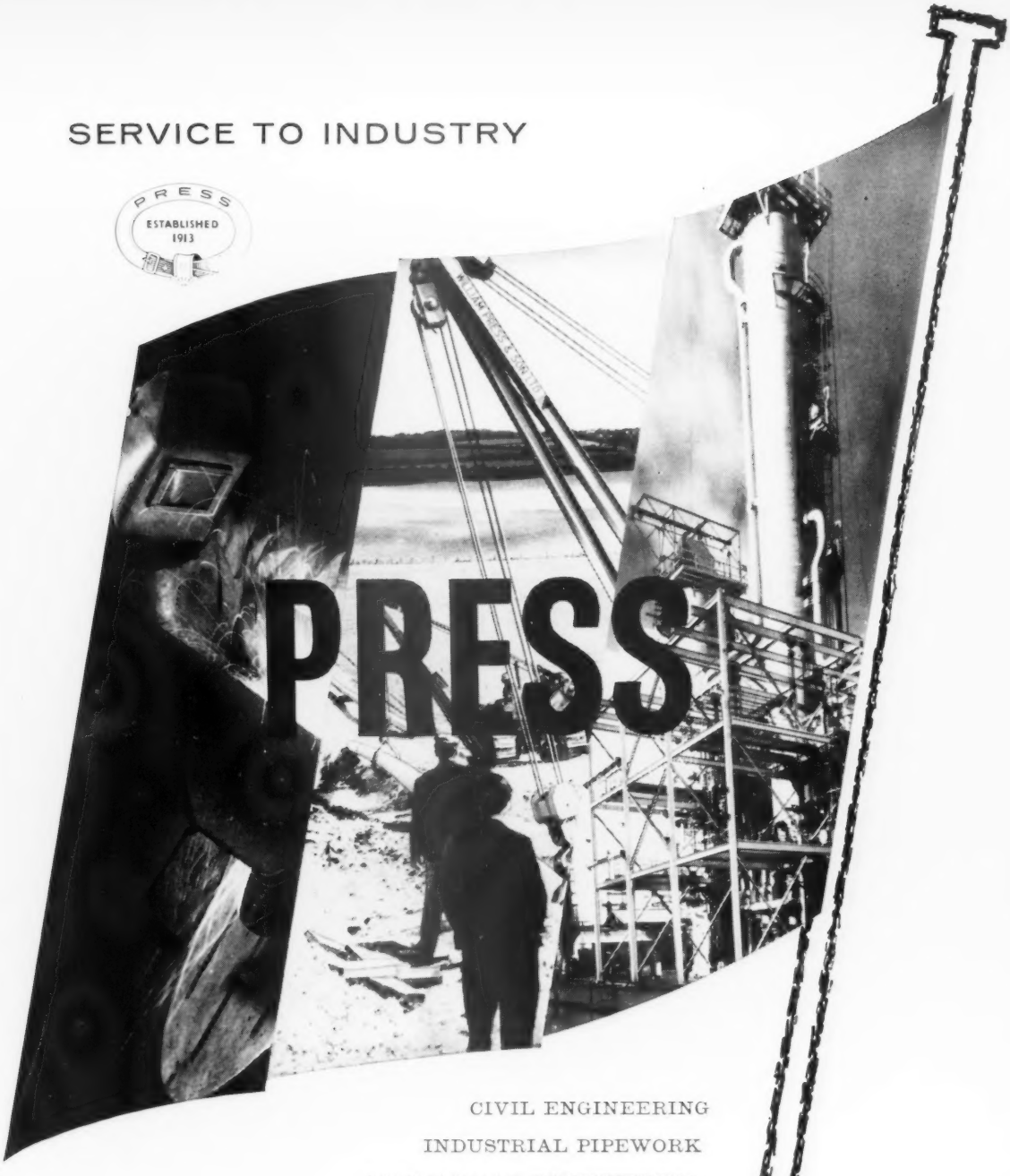

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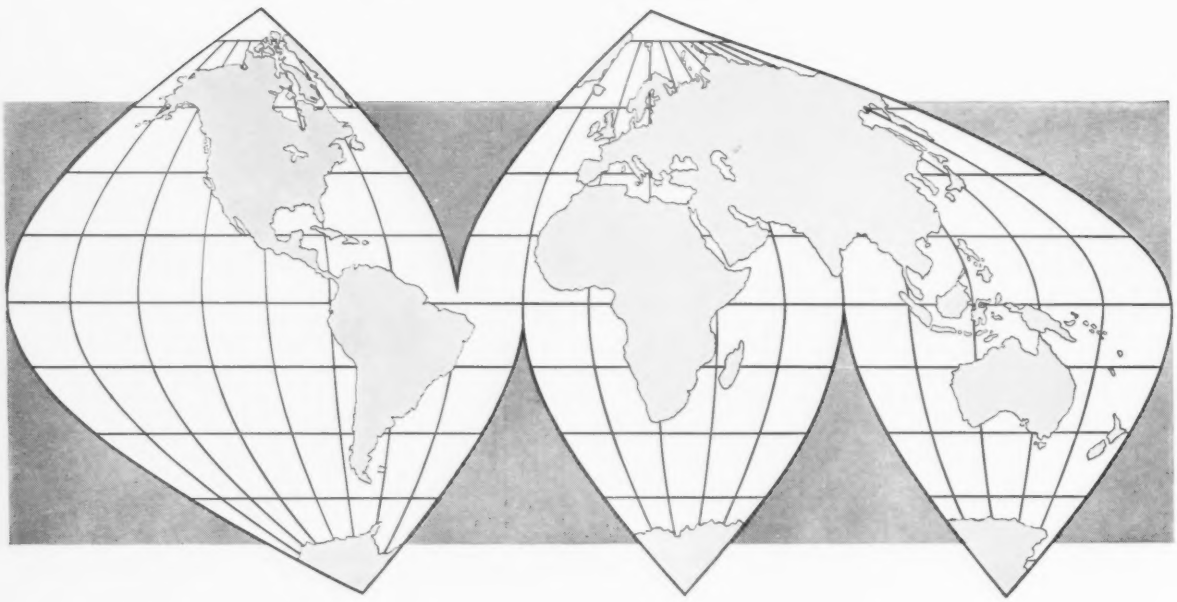

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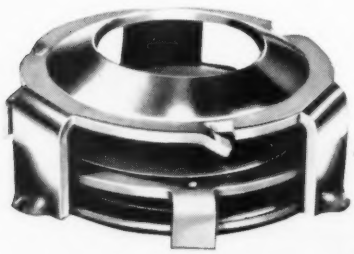

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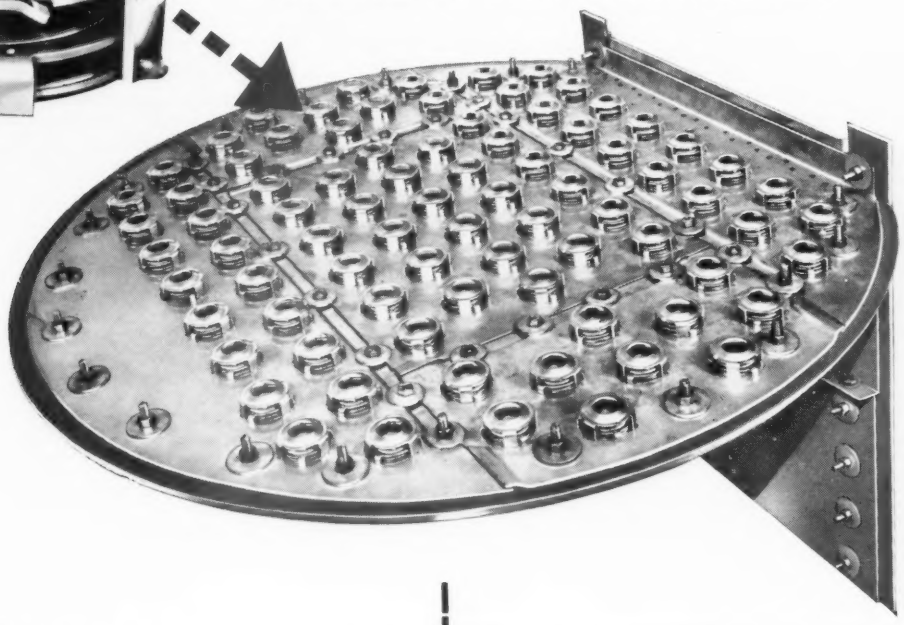

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	Page
Anchor Chemical Co. Ltd. ... ... *(Mayfair Advertising Ltd)*	Sept.
Ashmore, Benson, Pease & Co.	Sept.
Associated Electrical Industries Ltd ... *(Technical & General Advertising Agency Ltd)*	Nov.
Audley Engineering Co. Ltd ... ... *(Edward Hilton Advertising Ltd)*	xxi
Beldam Asbestos Co. Ltd ... ... *(G. J. Lashbrook Advertising)*	Nov.
Victor Blagden & Co. Ltd ... ... *(Press & General Publicity Service Ltd)*	xxii
Blaw Knox Chemical Engineering Co. Ltd ... *(Auld & Tilbury Ltd)*	Oct.
British Petroleum Co. Ltd. The ... ... *(S. H. Benson Ltd)*	iv
Cameron Iron Works Inc ... ... *(Boone and Cummings)*	xxiii
Cape Asbestos Co. Ltd. The ... ... *(Taylor Advertising Ltd)*	vi
Clark Bros. Co. (One of the Dresser Industries) *(The McCarty Co. (Advertising) Inc)*	June
A. F. Craig & Co. Ltd	iii
Crosby Valve & Engineering Co. Ltd	v
De Havilland Propellers Ltd ... ... *(Samson Clark & Co. Ltd)*	xix
Dewrance & Co. Ltd ... ... *(S. H. Wright & Co. Ltd)*	xii
Dorr-Oliver Co. Ltd	Sept.
Drayton Regulator & Instrument Co. Ltd ... *(Fordham Sadler Advertising Ltd)*	Nov.
Dresser Industries Inc ... ... *(Persons Advertising Inc)*	Sept.
Drums Ltd ... ... *(Mayfair Advertising Ltd)*	xvi
English Electric Co. Ltd. The ... ... *(Technical Advertising Service)*	xxviii
Esso Petroleum Co. Ltd ... ... *(McCann-Erickson Advertising Ltd)*	xiii
Fisher Governor Co. Ltd ... ... *(Glovers Advertising Ltd)*	i
Fodens Ltd ... ... *(Herbert Greaves Ltd)*	Oct.
A. Gallenkamp & Co. Ltd ... ... *(D. J. Mackridge & Partners Ltd)*	Nov.
General Electric Co. Ltd. The ... ... *(Smee's Advertising Ltd)*	xxx
G. S. Hall Ltd ... ... *(Industrial Publicity Service Ltd)*	xii
Matthew Hall & Co. Ltd ... ... *(R. wilnson-Broughton)*	Page xvii Nov.
John Harper & Co. Ltd ... ... *(Cross-Courtney Ltd)*	vii
Honeywell Controls Ltd ... ... *(T. G. Scott & Son Ltd)*	Nov.
International Paints Ltd ... ... *(Mayfair Advertising Ltd)*	Nov.
Island View Storage (Pty) Ltd ... ... *(Richard F. Robinow)*	viii
A. Johnson & Co. (London) Ltd ... ... *(A. T. A. Advertising Ltd)*	xx
S. H. Johnson & Co. Ltd ... ... *(Mayfair Advertising Ltd)*	Nov
Kellogg International Corporation ... ... *(Reynell & Son Ltd)*	xiv
Lake & Elliot Ltd ... ... *(Ripley, Preston & Co. Ltd)*	Nov.
J. & T. Lawrie Ltd ... ... *(Doig Advertising Ltd)*	xx
London & Thames Haven Oil Wharves Ltd ...	xxvii
M. & C. Switchgear Ltd ... ... *(Rex publicity Ltd)*	Nov.
A. & J. Main & Co. Ltd ... ... *(Hannaford & Goodman Ltd)*	xvii
Metal Containers Ltd ... ... *(Murray-Watson Ltd)*	Back Cover
Metal Propellers Ltd ... ... *(Hall Publicity Ltd)*	xxxi
Mission Manufacturing Co. Ltd ... ... *(Walter Skinner Ltd)*	ix
L. A. Mitchell Ltd ... ... *(Wilson Advertising Ltd)*	xi
Mobil Oil Co. Ltd ... ... *(Masius & Ferguson Ltd)*	Nov.
Motherwell Bridge Contracting & Trading Co. Ltd	xxiv
National Benzole Co. Ltd ... ... *(London Press Exchange Ltd)*	Nov.
North British Rubber Co. Ltd. The ... ... *(Robert Freeman Co. Ltd)*	Nov.
F. Perkins Ltd ... ... *(Crane Publicity Ltd)*	Sept.
Petrofina (Gt. Britain) Ltd ... ... *(Downtons Ltd)*	Sept.
P. G. Engineering Ltd	Page x
Power-Gas Corporation Ltd	Sept.
Premaberg (Great Britain) Ltd	Nov.
W. Press & Sons Ltd ... ... *(Kingham Advertising Agency)*	xxix
Prices (Bromborough) Ltd ... ... *(Lintas Ltd)*	Sept.
Pyrene Co. Ltd. The ... ... *(Nelson Advertising Service Ltd)*	Sept.
John Rabone & Sons Ltd	Sept.
Rotork Engineering Co. Ltd ... ... *(Trowbridge Pritchard & Co. Ltd)*	viii
Serck Radiators Ltd ... ... *(Longleys & Hoffmann Ltd)*	Inside Front Cover
Shell International Petroleum Co. Ltd ... *(Graham & Gillies Ltd)*	xxvi
Shell-Mex & B.P. Ltd ... ... *(Colman, Prentis & Varley Ltd)*	xxv
SIE Division of Dresser AG ... ... *(J. Wild Recklameberator BSR)*	Oct.
Simmons & Hawker Ltd ... ... *(Broadway Advertising Services Ltd)*	Aug.
Peter Spence & Sons Ltd ... ... *(Holmwood Advertising Ltd)*	Nov.
Stewarts and Lloyds Ltd ... ... *(H. Ramond Morgan)*	Sept.
Stone & Webster Engineering Ltd *(Thames Advertising Services Ltd)*	Inside Back Cover
Stothert & Pitt Ltd ... ... *(Trowbridge, Pritchard & Co. Ltd)*	Nov.
Surface Protection Ltd ... ... *(Nigel Rainbow & Partners Ltd)*	xv
Tate Pipe Lining Processes Ltd ... ... *(G. Street & Co. Ltd)*	viii
H. Tinsley & Co. Ltd ... ... *(James Sutherland Publicity Ltd)*	ii
United Steel Companies Ltd ... ... *(Rowlinson-Broughton Ltd)*	Nov.
Vokes Ltd ... ... *(Trowbridge Pritchard & Co. Ltd)*	Nov.
C. C. Wakefield & Co. Ltd ... ... *(Dorland Advertising Ltd)*	xxxii
West's Piling & Construction Co. Ltd	Sept.
Whessoe Ltd	Nov.
Winn & Coales Ltd ... ... *(Stephens Advertising Service Ltd)*	Nov.

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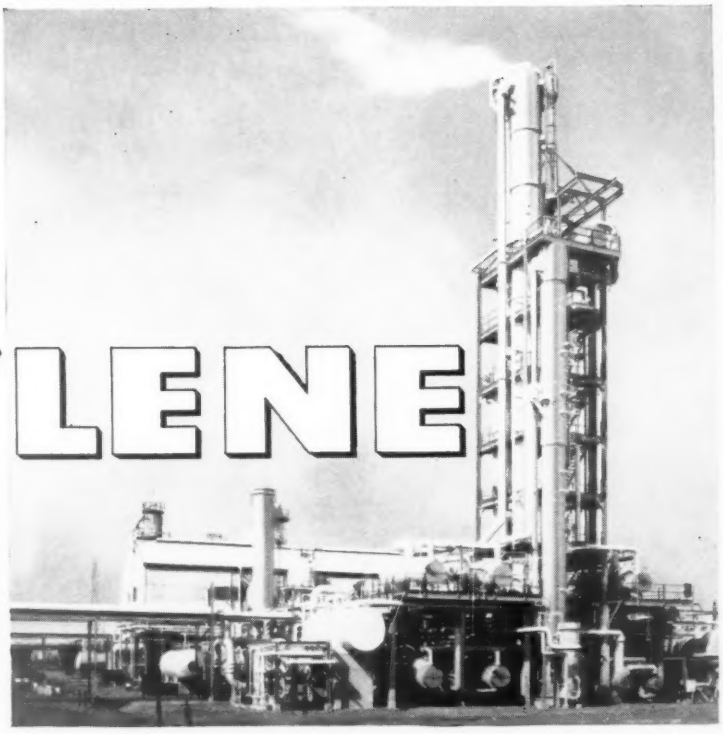

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